



Intel® Next-Gen Wireless-N

Reviewer's Guide



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Requires Intel® Next-Gen Wireless N technology and Connect with Intel® Centrino® processor technology certified wireless n access point. Wireless n access points without the Connect with Intel Centrino technology processor identifier may require additional firmware for increased performance results. Check with your PC and access point manufacturer for details

Up to 2x greater range and up to 5x better performance with optional Intel® Next-Gen Wireless N technology enabled by 2x3 Draft N implementations with 2 spatial streams. Actual results may vary based on your specific hardware, connection rate, site conditions, and software configurations. See <http://www.intel.com/performance/mobile/wireless/index.htm> for more information. Also requires a Connect with Intel® Centrino® processor technology certified wireless n access point. Wireless n access points without the Connect with Intel Centrino processor technology identifier may require additional firmware for increased performance results. Check with your PC and access point manufacturer for details.

Intel® Active Management Technology requires the platform to have an Intel® AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. With regards to notebooks, Intel AMT may not be available or certain capabilities may be limited over a host OS-based VPN or when connecting wirelessly, on battery power, sleeping, hibernating or powered off. For more information, see <http://www.intel.com/technology/manage/iamt>.

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1 Using this Reviewer's Guide

In this Section

- [About this Guide](#)
- [How this Guide is Organized](#)

1.1 About this Guide

This reviewer guide focuses on the Intel's latest Intel® Centrino® Duo processor technology with Intel® Next-Gen Wireless-N embodied in the Intel® PROSet/Wireless Software v11.x and the Intel® Wireless WiFi Link 4965AGN adapter. It presents the key features and benefits of these products and takes you on a hands-on test drive to experience the next generation of wireless networking.

This guide covers PROSet/Wireless and the 4965AGN operating on the Microsoft Windows XP* and Microsoft Windows Vista* operating systems. Most of the features included in PROSet/Wireless running on Microsoft Windows XP are incorporated into the Microsoft Windows Vista operating system. This guide assumes you're using an Intel Centrino Duo processor technology notebook with the PROSet/Wireless software installed. If you do not have the PROSet/Wireless v11.x installed, see Appendix A Installing Intel PROSet/Wireless Software.

1.2 How this Guide is Organized

This guide is organized into the following sections:

- [Technology and Product Overview](#) – Provides an overview of the latest wireless technology, Draft-N, based on the draft IEEE 802.11n specifications and the key features of PROSet/Wireless and 4965AGN, and what they mean to Intel Centrino processor technology notebook users and IT administrators.
- [Getting Started](#) – Describes how to make the PROSet/Wireless connection manager your default wireless connection manager to take advantage of next-generation wireless networking. This section also provides a brief orientation tour of the PROSet/Wireless connection manager user interface.
- [Connecting to Wireless Networks](#) – Shows you how easy it is to make wireless connections to non-secure and secure networks, configure secure Wi-Fi networks using Wi-Fi Protected Wireless Setup*, monitor the status of a wireless connection, and resolve connection issues using the Intel® Wireless Troubleshooter in Microsoft Windows XP.
- [Simplifying Wireless Network Access with Profiles](#) – Describes creating, editing and managing profiles using PROSet/Wireless in Microsoft Windows XP to simplify wireless network access to enhance your mobility. This section shows you how to use the Profile Wizard to quickly create profiles.
- [Making Wireless Security Easy](#) – Highlights the key security enhancements incorporated in PROSet/Wireless in Microsoft Windows XP including automatic detection of AP security policies, easy configuration of security settings for PROSet/Wireless connection manager for any wireless network, from the home network to the enterprise campus. PROSet/Wireless support for Wi-Fi Protected Setup enables easy setup of security-enabled Wi-Fi networks in the home and small office environments.
- [Managing Wireless Clients in the Enterprise](#) – Provides an overview of the tools and features that dramatically streamline wireless client deployments in enterprise environments.
- [Using PROSet/Wireless and 4965AGN in Microsoft Windows Vista](#) – Describes the subset of PROSet/Wireless features available in Microsoft Windows Vista. Most of the PROSet/Wireless features on Microsoft Windows XP notebook computers are now part of Microsoft Windows Vista, such as creating profiles and enabling security.



Note: For additional resources on PROSet/Wireless, refer to:
http://www.intel.com/network/connectivity/products/wireless/proset/proset_software.htm. For
additional resources on the 4965AGN, refer to
<http://www.intel.com/network/connectivity/products/wireless/index.htm>.

2 Technology and Product Overview

In this Section

- [Intel® Centrino Duo Processor Technology with Intel® Next-Gen Wireless-N](#)
- [Next Generation Wi-Fi: Draft-N](#)
 - [MIMO](#)
 - [Double-Wide Channels](#)
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2.1 Intel® Centrino® Duo Processor Technology with Intel® Next-Gen Wireless-N

Intel® Centrino® Duo processor technology with Intel® Next-Gen Wireless-N delivers the next generation of mobile computing possibilities. Mobile computing built on Intel Centrino Duo processor technology with the Intel® Core™2 Duo processor delivers a high performance processor, robust graphics, and efficient power use to get the most out of today's demanding high-definition entertainment and business productivity requirements. Intel Next-Gen Wireless-N is the term for Intel wireless N products. Intel® Wireless Wi-Fi Link 4965AGN is a specific Intel WLAN product based on the latest Wi-Fi breakthrough, Draft-N.



Note: Intel® Centrino® Pro processor technology is designed for business environments. With Intel Centrino Pro processor technology, IT managers will be able to manage and protect their notebooks over Wi-Fi. The result is better protected PCs, increased IT department compliance, more accurate PC inventories, fewer desk-side visits and less interruption to business. Intel Centrino Pro processor technology is not covered in this guide.

2.2 Next Generation Wi-Fi: Draft-N

Based on the core features of the draft 802.11n specification, Draft-N delivers dramatic improvements in performance and range over 802.11a/b/g networks. Intel Next-Gen Wireless-N enables up to five times the performance and two times the range of 802.11a/g networks. Beyond making your data move faster, Draft-N also spreads its coverage beyond the limits of 802.11a/g networks. And Draft-N supports both the 2.4GHz and 5GHz unlicensed radio frequencies used by existing 802.11a/b/g networks for compatibility. Under the hood of Draft-N's better performance and broader coverage are new wireless technologies: MIMO, double-wide channels, and bigger payloads.

2.2.1 MIMO

MIMO (Multiple Input, Multiple Output) uses multiple transmitters and receivers to transfer more data at the same time (Figure 1). MIMO technology exploits a radio-wave phenomenon called multipath where transmitted information bounces off walls, ceilings, and other objects, reaching the receiving antenna multiple times via different angles and at slightly different times. Multipath is the bane of 802.11a/b/g networks that can't take advantage of it because of their simple SISO (Single Input, Single Output) technology. The result is that 802.11a/b/g networks take performance hits because reflected signals are more difficult to capture. MIMO technology leverages multipath behavior by using multiple, "smart" transmitters and receivers with an added "spatial" dimension to dramatically increase performance and range.

MIMO makes antennas work smarter by enabling them to combine data streams arriving from different paths and at different times to effectively increase receiver signal-capturing power. Smart antennas use spatial diversity technology, which puts surplus antennas to good use. If there are more antennas than spatial streams, as in a 2x3 (two transmitting, three receiving) antenna configuration, then the third antenna can add receiver diversity and increase range.

Figure 1: MIMO Technology Uses Multiple Radios to Transfer More Data at the Same Time



2.2.2 Double-Wide Channels

Draft-N effectively creates more room for data with a double-wide spectrum channel. Double-wide channels are created by bonding together two 20MHz wireless communication channels into a 40MHz channel (Figure 2). This channel bonding increases the data rate because data rate is directly proportional to channel band-width. 802.11a/b/g networks use a single 20MHz channel. Due to the limited available bandwidth in the 2.4GHz frequency, the higher-bandwidth 5GHz frequency best supports channel bonding. Intel supports channel bonding only in the 5GHz frequency.

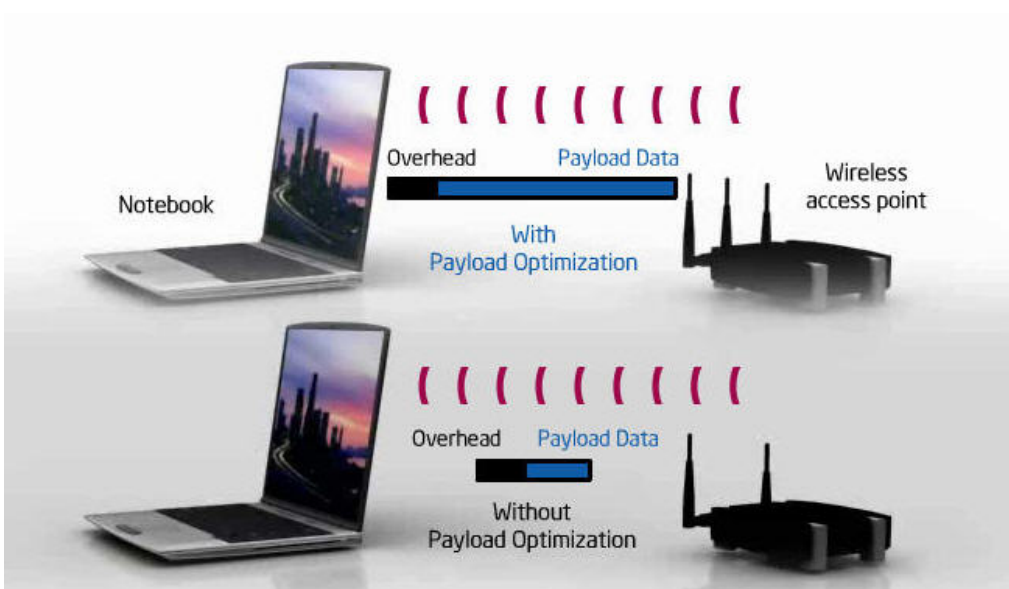
Figure 2: Channel Bonding Combines Two 20MHz Channels to Transfer Twice the Data



2.2.3 Bigger Payloads

Draft-N delivers bigger data packages than 802.11a/b/g networks. Bigger data payloads reduce network management overhead, which means your data moves faster (Figure 3). Aggregating data into bigger payloads means fewer ACKs (acknowledgements) are sent by the receiver acknowledging the data was received, reducing overhead traffic. Instead of sending three payloads with three ACKs sent back, a single payload is sent requiring only one ACK.

Figure 3: Payload Optimization Delivers More Wireless Data Per Transfer



2.3 Connect with Intel® Centrino® Processor Technology

Early third-party Draft-N products failed to meet end-user expectations on performance and interoperability. Intel took access point (AP) testing to the next level by adding critical usage-model testing and performance tuning at Intel's home and office test ranges.

The Connect with Intel® Centrino® processor technology (Connect with Centrino) compatibility and real-world performance testing fills in current testing gaps while complementing forthcoming Draft-N Wi-Fi Alliance certification. AP's passing Intel's test plan are certified with the Connect with Centrino identifier (Figure 4) to communicate Intel Next-Gen Wireless-N compatibility and high performance with leading AP manufacturers, such as Asus, Belkin, Buffalo, D-Link and Netgear. These manufacturers offer Draft-N wireless APs that have gone through the rigorous certification process, have passed the tests, and have been awarded the Connect with Centrino identifier.

The Connect with Centrino program enables consumers to connect with confidence based on thousands of real-world test cases. Consumers simply look for the Connect with Centrino identifier when buying Draft-N AP to ensure enhanced performance and dependable connectivity with notebook computers based on Intel Centrino Duo processor technology.

Figure 4: The Connect with Intel® Centrino® Identifier



2.4 Intel® PROSet/Wireless Software and Intel® Wireless Link 4965AGN Features

PROSet/Wireless v11.x supports Microsoft Windows XP and Microsoft Windows Vista. On Microsoft Windows Vista, the PROSet/Wireless software includes a subset of configuration features available on Microsoft Windows XP. Many of the features included in PROSet/Wireless software running on Microsoft Windows XP are now available in the Microsoft Windows Vista operating system. PROSet/Wireless for Microsoft Windows Vista includes the Administrator Tool, Advanced Statistics, and the Manual Diagnostics Tool.



Note: Depending on the vendor of your notebook computer, the PROSet/Wireless software may or may not be installed. See Appendix A Installing Intel PROSet/Wireless Software.

The 4965AGN is an embedded IEEE 802.11 a/b/g/Draft-N PCIe MiniCard form factor network adapters operating in the 2.4GHz and 5GHz spectrum. The 4965AGN product is an embedded 802.11a/b/g/Draft N PCIe* Mini Card network adapter card that operates in both the 2.4GHz and 5.0GHz spectrum, delivering high throughput and a host of features.

The Intel wireless client combines ease of use, robust security, client manageability, flexibility, and performance. The following sections describe the key features and benefits of the Intel wireless solution.

2.4.1 Ease of Use

For wireless network users, the mobile experience just got a lot better. The PROSet/Wireless connection manager incorporates dramatically enhanced usability. The following features enable a superior mobile experience for users:

- **Simplified User Interface** – A newly updated user interface provides simplified connectivity to wireless networks. Users get a complete view of the WLAN environment in a single window that includes available networks and profiles. Taskbar icons and desktop alerts provide real-time information about the status of WLAN connections without even opening the application.
- **Detect and Connect Networking** – Auto detection of wireless network settings from APs or preconfigured profiles provided by administrators removes the user from the configuration process of wireless network connections. All wireless networks are automatically detected including silent mode wireless networks that don't broadcast their SSID information.
- **Profile Management** – Wireless network settings are automatically saved as profiles or profiles can be easily created and edited using the Profile Wizard. Searches for APs provide automatic connections to available networks based on pre-defined profile priority rankings. A profiles list provides convenient access to wireless networks as users roam.
- **Intel® Wireless Troubleshooter** – This intelligent tool puts a powerful repair kit in the hands of WLAN users. It automatically detects the problem, explains the problem, and provides the recommended steps to resolve the issue. The Wireless Troubleshooter automatically activates when a user is having trouble making a connection. At the same time, it logs the sequence of events that occurred so IT administrators can review it remotely to troubleshoot the problem.
- **Wi-Fi Protected Setup (WPS)** – A Wi-Fi Alliance standard designed to ease the setup of security enabled Wi-Fi networks in the home and small office environment. PROSet/Wireless v11.x implements WPS to enable you to configure your wireless network from your Intel wireless client. WPS is not available in Microsoft Windows Vista.

2.4.2 Robust Security

No longer does mobility mean less secure connections than wired networks. Incorporating the latest IEEE 802.11i, IEEE 802.1x and Wi-Fi Alliance* security standards, the Intel wireless client delivers the security enhancements required for today's home, small business and enterprise wireless networks.

- **IEEE 802.11i/WPA/WPA2 Security** – PROSet/Wireless supports IEEE 802.11i security standards and is certified by the Wi-Fi Alliance for WPA2 Personal and WPA2 Enterprise. This second generation of Wireless Protected Access complies with the IEEE 802.11i security specification.
 - **WPA2-Personal** – Allows home or small business networks to support robust security without the extensive authentication infrastructure of enterprise environment. WPA2 Personal Security supports the same high-level WPA2 with Advanced Encryption Standard (AES) encryption used in enterprise environments for robust protection of even the smallest network.
 - **WPA2-Enterprise** – Provides more enhanced security options for server-based authentication based on the IEEE 802.1x standard.
- **802.1x Authentication** – IEEE standard for Port-Based Network Access Control used in conjunction with Extensible Authentication Protocol (EAP) methods to provide access control for wireless networks.

- **Automatic Security Level Detection** – The Intel® Security Assistant removes the guesswork for users connecting to wireless networks using advanced WPA or WPA2-Personal security configurations. When a user is connected to an access point for the first time, the client automatically scans the access point for supported security settings. In enterprise environments, profiles created by administrators using the Administrator Tool hide complex security configurations from users to make secure wireless networking seamless.
- **Easy Security Configuration** – PROSet/Wireless enhances security by simplifying security configuration with Wi-Fi Protected Setup for home or small office environments. Wi-Fi Protected Setup is not available in Microsoft Windows Vista.
- **Single Sign-On (SSO)** – Administrator Profiles created in the Administrator Tool provide advanced profile management options including Single Sign On (SSO) profiles to streamline and enhance network access. SSO profiles consist of Pre-Logon and Persistent connections. Persistent connection profiles enable a machine's WLAN connection to be maintained regardless of whether users are logged on or off on the domain and preserves wireless connectivity until the system is powered off. A Pre-Logon profile is applied and connection is made prior to the Microsoft Windows logon sequence. It allows the IEEE 802.1x credentials to match Microsoft Windows log on user name and password credentials for wireless network connections.

2.4.3 Client Manageability

For the enterprise, no longer does mobility mean losing control over clients or higher deployment costs. The Intel wireless client supports enterprise-class tools and features to ensure seamless integration into enterprise environments.

- **Intel® Active Management Technology over Wireless** – Enables IT managers to remotely access networked computing systems, even when the operating system has locked up or the hard drive has crashed. Intel® AMT is integrated into tamper-resistant hardware and firmware to prevent intentional or inadvertent removal of inventory, remote control or virus-protection agents from the systems. The technology features an out-of-band link that is independent of the operating system, allowing IT managers to access a system even if the operating system is inoperative.



Note: Intel® AMT over Wireless is available only on Intel® Centrino® Pro processor technology notebooks.

- **Business Class Wireless Suite** – Ensures full compatibility between the Intel wireless client and the Cisco WLAN infrastructure. Working closely with Cisco, the Intel wireless client provides the features that enable the enterprise to effectively deliver all data, voice and video over a Cisco WLAN infrastructure. Intel Centrino Duo processor technology fully integrates into the Cisco Unified Wireless Architecture.
- **Administrator Tool** – Included with the PROSet/Wireless software, the Administrator Tool delivers a comprehensive suite of powerful, yet easy-to-use tools for centralized configuration and management of wireless clients.

2.4.4 Performance and Flexibility

No longer does mobility mean slower network performance or incompatible wireless networks. The 4965AGN adapter incorporates new performance and WLAN connectivity features to expand the capabilities of wireless networking.

- **Dual Band/Quad-Mode Solution** – The 4965AGN provides deployment flexibility and connectivity convenience by offering a quad mode (supporting 802.11a/b/g/Draft-N) product, which is capable of connecting to new "Connect with Centrino" wireless N Access Points / Routers, but can also connect to any of the legacy Wi-Fi standards, 802.11a, b or g.




- **Connect with Confidence** – Intel Connect with Centrino ensures compatibility and high performance with leading access points. The Connect with Centrino program has certified AP compatibility and real-world performance with 4965AGN notebooks and leading Draft-N Wi-Fi equipment vendors.
- **Flexible Wireless Connectivity** – The 4965AGN with the PROSet/Wireless connection manager operates seamlessly in Cisco's WLAN infrastructures. The PROSet/Wireless and 4965AGN support the latest Cisco Compatible Extensions version 4.0.
- **Up to 5X Faster** – Data rates up to 300Mbps offer major improvement over today's 802.11a/g products that deliver 54Mbps. This helps overcome network capacity issues, allowing increased simultaneous network activity for large file transfers, streaming HD video, multi-player gaming, VoIP and more.
- **Up to 2X Greater Range** – MIMO, diversity and three antennae support enables better wireless reception for greater bandwidth at farther distances. Reduces the number of "dead zones", dropped data packets, network re-connects and dramatically improves connectivity throughout the home.
- **Longer Battery Life** – Optimized power modes (sleep states) reduce power consumption during periods of inactivity. Reduced WLAN power consumption can help deliver longer platform battery life for greater utility, enjoyment, and convenience.

3 Getting Started

In this Section

- [Starting the PROSet/Wireless Connection Manager](#)
- [Making PROSet/Wireless Your Wireless Manager](#)
- [Enabling/Disabling the Radio](#)
- [Touring the PROSet/Wireless Connection Manager](#)

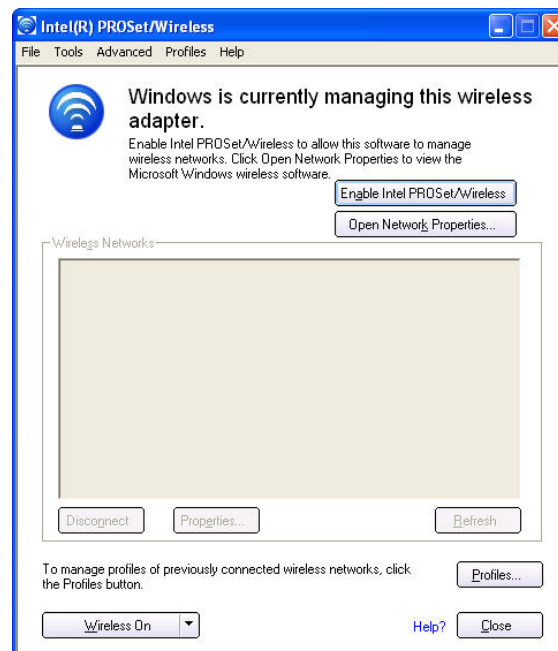
3.1 Starting the PROSet/Wireless Connection Manager

To start PROSet/Wireless connection manager, right-click the Taskbar icon  located in the lower right corner of your Windows Desktop to open the Taskbar menu. Click **Open Intel PROSet/Wireless**. The Intel(R) PROSet/Wireless window displays.


3.2 Making PROSet/Wireless Your Wireless Manager

If the PROSet/Wireless connection manager detects another software application trying to communicate with the wireless device, you are notified of this behavior (Figure 5) in the Intel(R) PROSet/Wireless window. For example, Microsoft Wireless Zero Configuration* service is activated as your wireless manager in Microsoft Windows XP.

Figure 5: Switching Wireless Managers



Click **Enable Intel PROSet/Wireless** to enable the PROSet/Wireless connection manager. The PROSet/Wireless connection manager becomes active. You can easily switch between wireless connection managers from PROSet/Wireless connection manager.

 **Note:** Any wireless profiles created in Microsoft Windows XP Wireless Zero Configuration are not visible in PROSet/Wireless connection manager and any profiles created in PROSet/Wireless software are not visible in Wireless Zero Configuration.

If you use software provided by a hotspot provider/location (coffee shop, airport terminal, etc.), PROSet/Wireless notifies you and then disables itself. It cannot manage the wireless device when

another wireless manager communicates with the wireless device. To take advantage of the PROSet/Wireless features, disable or remove this software when you leave the hotspot.

3.3 Enabling/Disabling the Radio

Before you can connect to a wireless network, you need to make sure your WLAN adapter radio is turned on. When your WLAN adapter is enabled, a LED displays on your notebook (not all notebooks have a WLAN LED) or taskbar indicating WLAN access is available. On most notebooks, there are typically multiple ways to enable/disable the WLAN adapter radio:



Tip: If you're not using the wireless connection, disable the radio save battery power.

- **Computer Radio On or Off Switch** – If your computer has an external switch installed, use it to switch the radio on or off. Refer to the computer manufacturer for more information about this switch. If you have the PROSet/Wireless connection manager installed, the current state of the radio displays in the Intel(R) PROSet/Wireless main window and on the Taskbar.
- **PROSet/Wireless** – From PROSet/Wireless connection manager, the radio can be switched on or off. The status icon on PROSet/Wireless displays the current state of the radio. From the Intel(R) PROSet/Wireless main window, click **Wireless On** or **Wireless Off** to toggle the radio on or off.
- **Taskbar Icon** – To switch the radio off or on, right-click the Taskbar icon and select Wireless On or Wireless Off.



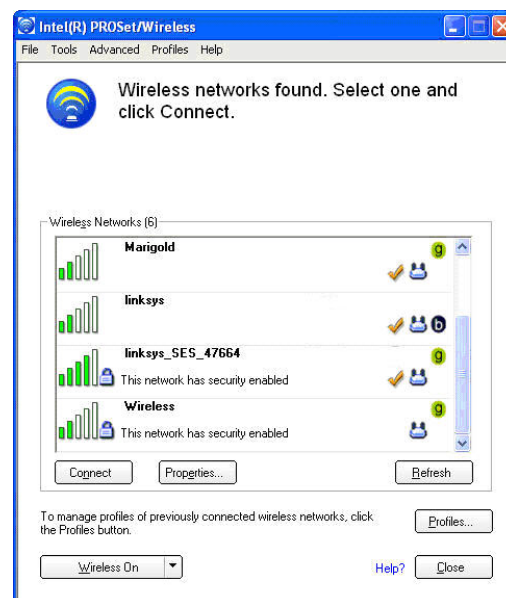
Note: If you disable the radio from Microsoft Windows, then you must use Microsoft Windows to enable the radio. You cannot use a hardware switch or the PROSet/Wireless connection manager to enable the radio again.

Once the radio is enabled, the Intel(R) PROSet/Wireless window is displayed with a listing of all available wireless networks detected (Figure 6).

3.4 Touring the PROSet/Wireless Connection Manager

The Intel(R) PROSet/Wireless window provides the visibility to the available wireless networks and is the gateway to all the features of PROSet/Wireless and the 4965AGN.

Figure 6: Intel(R) PROSet/Wireless window



The top portion of Intel(R) PROSet/Wireless window provides information about the status of a connection. For example, if a connection is being made, the blue circle is animated and the message **Connecting to wireless...** is displayed. After a connection is made, connection information is displayed.

The **Wireless Networks** list displays the list of all available wireless networks. It displays key information using icons (Table 2 describes a few common icons). For example, a secure wireless network is indicated by a lock. A series of bars graphically represent the strength of the network radio signal. Icons also display what mode an AP is operating at, such as 802.11n.

Table 1 describes the functions of the buttons in the Intel(R) PROSet/Wireless window.






Table 1: Buttons in the Intel(R) PROSet/Wireless window

Button	Description
Wireless On/Wireless Off	Activates or deactivates wireless adapter.
Details	Displays the Connection Details window with detailed information about the profile configuration
Connect/Disconnect	Enables or disables connection to selected/current connection
Properties	Displays detailed information about the selected network and its access points.
Profiles	Displays the Profiles window for creating, editing and managing your WLAN profiles.
Refresh	Forces a new scan for wireless networks.



Tip: The PROSet/Wireless connection manager detects all available network including stealth networks, which are networks that do not broadcast their SSID information.

Table 2: Wireless List Information

Name	Description
	Signal strength of the wireless network access point.
	The wireless network uses Network (infrastructure) mode.
	The network uses security encryption.
	The band frequency used by the wireless network (802.11a, 802.11b, 802.11g), 802.11n
	Identifies a network that is connected and has a profile in the profiles list.

The PROSet/Wireless connection manager provides the following configuration tools from the Intel(R) PROSet/Wireless window menus:

Tools

- **Application Settings** – Provides configuration options for the PROSet/Wireless Software.
- **Intel® Wireless Troubleshooter** – Displays the Intel Wireless Troubleshooter that automatically appears when a WLAN connection is not working properly. You can access troubleshooting information manually using this option.
- **Manual Diagnostics Tool** – Allows you to run a set of diagnostics tests that verify the functionality of your wireless adapter and the status of your wireless connection.
- **Administrator Tool** – Displays the client management tool for IT administrators to configure client profiles. This tool is password protected. The first time you start it, you are prompted to create a password.

Advanced

- **Adapter Settings** – Provides configuration settings for the Intel wireless adapter.
- **Advanced Statistics** – Displays connection statistics, such as association, roaming and RX/TX.
- **Use Windows to manage Wi-Fi** – Selects Microsoft Windows XP as the wireless manager.

Profiles

- **Manage Profiles** – Displays the Profile window for creating and managing WLAN connection profiles.
- **Manage Exclusions** – Displays access points and networks that cannot be connected to automatically. Dimmed entries are rogue (unauthorized) access points.

3.5 Wireless Networking from the Taskbar

The PROSet/Wireless icon displays on the Microsoft Windows Taskbar located in the lower right corner of your Windows desktop (Figure 7). It provides an easy visual way to view the status of wireless network connections as well as access the Intel(R) PROSet/Wireless window. Table 3 shows common connection status icon changes.

Figure 7: PROSet/Wireless Icon on the Taskbar



Right-clicking the status icon to display the menu options (Figure 8).

Figure 8: PROSet/Wireless Taskbar Menu



The tool tips and desktop alerts provide feedback and interaction. Desktop alerts are displayed when your wireless network changes state. When user action is required, a desktop alert displays. If you click the alert, then an appropriate action is taken. For example when wireless networks are found, an alert displays (Figure 9). If you are automatically connected to a wireless networks, a desktop alert is displayed with the connection information (Figure 10).





Figure 9: Wireless Networks found



Figure 10: Desktop Alerts provide status information

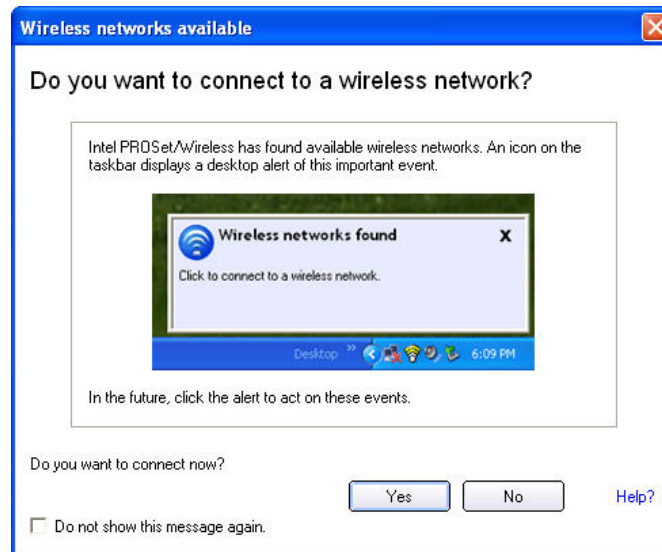


Table 3: Connection Status Taskbar Icons

Icon	Description
	Wireless Off – Wireless adapter is off, disabled or the driver is not installed. Wireless device does not transmit or receive while it is off. Select Wireless On to enable the adapter. Icon is white and static.
	Searching for Wireless Networks – Wireless adapter searches for available wireless networks. Icon is white with animation.
	Wireless Network Found – An available wireless network is found. Icon is yellow.
	Connected to a Wireless Network – Client connected to a wireless network. A Tool Tip displays network name, speed, signal quality and IP address. Icon is green with waves that reflect signal quality; the more waves the better the signal quality.

If you ignore the **Wireless networks found** desktop alert, PROSet/Wireless displays a window (Figure 11) with the prompt: **Do you want to connect to a wireless network?** Click **Yes**. The Intel(R) PROSet/Wireless window opens.

Figure 11: Wireless networks available dialog



4 Connecting to Wireless Networks

In this Section

- [Making Wireless Network Connections](#)
- [Using Wi-Fi Protected Setup to Configure or Join a Network](#)
 - [Configuring an Access Point and Setting Up a Network](#)
 - [Connecting an Enrollee to a Network Access Point](#)
 - [Adding an Enrollee to an Existing Network at the Registrar](#)
- [Connecting to Home or Small Business Wireless Networks](#)
- [Connecting to Enterprise Wireless Networks](#)
 - [Making Persistent, Pre-Logon and VoIP Connections](#)
 - [Connecting to a Cisco Wireless Network](#)
- [Connecting to Silent Mode Wireless Networks](#)
- [Monitoring Wireless Connectivity](#)
- [Using Intel® Wireless Troubleshooter](#)
- [Excluding Wireless Networks](#)

4.1 Making Wireless Network Connections

The PROSet/Wireless connection manager makes connecting to wireless networks easy. It automatically detects wireless networks that are within range of your wireless adapter and displays them in the Wireless Networks list. If an available network has a matching profile, the PROSet/Wireless connection manager automatically connects to the network. The PROSet/Wireless connection manager's automatic detect and connect capabilities enables seamless wireless networking for users in any wireless network environment. For more information on PROSet/Wireless profile features, see **Section 5 Simplifying Wireless Network Access with Profiles**.

For home and small business wireless networks using WEP, WPA-Personal and WPA2-Personal security, users simply select the wireless network and click the **Connect** button the first time they make a connection. The PROSet/Wireless connection manager automatically creates a profile with all the network and security settings for future use. This eliminates the need for user configuration. Future network connections are made automatically when an existing profile matches an available network. For more information on PROSet/Wireless security features, see **Section 6 Making Wireless Security Easy**.



Note: Home and small business users can also use Wi-Fi Protected Setup (WPS) to configure a wireless network or join a network. See **Section 4.2 Using Wi-Fi Protected Setup to Configure or Join a Network**.

For enterprise wireless networks with advanced network access and security requirements, IT administrators create and distribute profiles using the Administrator Tool that enable users to seamlessly connect to wireless networks without user configuration of the client. For more information on the Administrator Tool, see **Section 7 Managing Intel Wireless Clients in the Enterprise**.

4.2 Using Wi-Fi Protected Setup to Configure or Join a Network

Wi-Fi Protected Setup (WPS) is designed to ease the set up of security-enabled Wi-Fi networks in the home and small office environments. Before WPS, users found these advanced security features difficult to configure correctly on their access points. As a result, Wi-Fi networks were left partially or completely unsecured. WPS products support the advanced security features provided by WPA* and WPA2*.

PROSet/Wireless implements WPS to permit easy and secure set up and management of a wireless network. You can use this capability to initially set up a wireless network and to introduce new devices to the network. PROSet/Wireless software uses an easy-to-use Wireless Network Configuration Wizard to set up your secure wireless network using WPS.

The following terms are used within the WPS process:

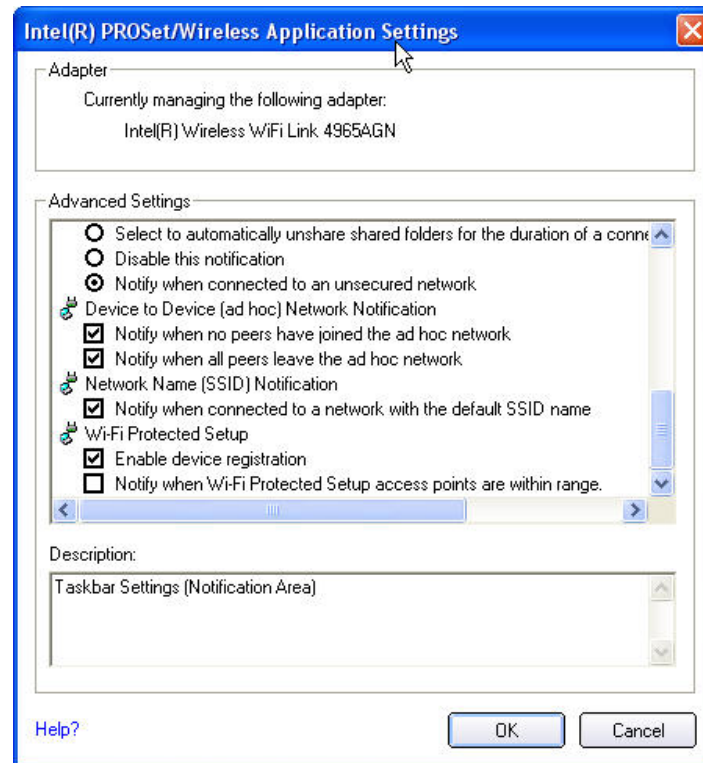
- **Access Point** – A device that connects wireless devices to the network. The access point (AP) is configured with the necessary network name (SSID) and security credentials.
- **Enrollee** – A device that seeks to join an access point or wireless network, but does not have the password or key for the access point or network. Once the device obtains the valid password or key, it becomes a member of the wireless network. PROSet/Wireless can be configured to operate as an enrollee for a supported access point.
- **Registrar** – A registrar is a logical entity (usually a computer) that allows other devices (usually a computer) to join the wireless network. PROSet/Wireless can be configured to operate as a registrar for a supported access point(s). The registrar securely transfers the access point key or password automatically.

4.2.1 Configuring an Access Point and Setting Up a Network

You can configure your wireless network using WPS from your Intel wireless client running PROSet/Wireless.

1. Locate the device ownership password for the access point. This is set by the manufacturer of the access point. The password is often located on a label on the bottom of the device.
2. Turn on the wireless network access point.
3. At the computer that you want to establish as the registrar, turn on Intel PROSet/Wireless.
4. In Intel PROSet/Wireless, click **Tools > Application Settings**. The Intel(R) PROSet/Wireless Application Settings window displays (Figure 12).
5. In the **Advanced Settings** area under **Wi-Fi Protected Setup (TM)**, turn on **Enable device registration**.

Figure 12: Wi-Fi Protected Setup Settings



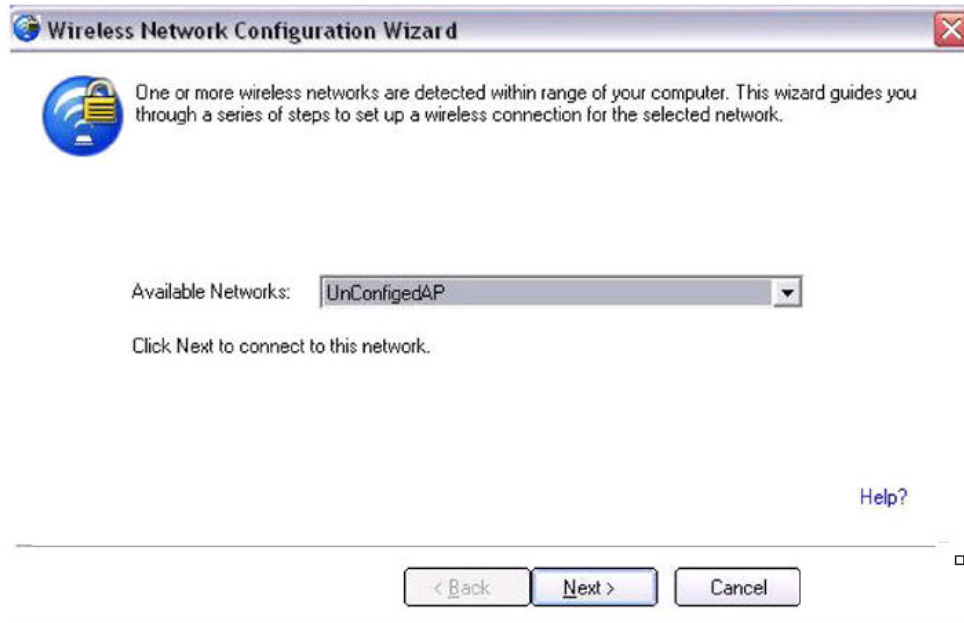
6. The following message (Figure 13) tells you that one or more compatible devices are within range of your computer. Click this message. (Or, you can select the network from the Wireless Networks list in the Intel PROSet/Wireless main window.)

Figure 13: Detecting WPS Devices Message



7. The Wireless Network Configuration Wizard (Figure 14) opens. Use the Available Networks list to select the network that you want to connect to. In this example, UnConfiguredAP. The listed network depends on what is detected. Click **Next**.

Figure 14: Wireless Network Configuration Wizard



8. Enter the Device Ownership Password that you retrieved from the access point. Click **Next**.
9. The next page displays the **Network Name**, **Security Type**, and **Password**. If the access point is already configured, it is grayed out; proceed to step 10. If the access point is not configured (fields are *not* grayed out), proceed to step 11.
10. After a few seconds the following message is displayed:
The access point is already configured. Do you want to reconfigure it?
If you do not want to reconfigure the access point, select **No**. The software joins the network, makes the connection, and creates a profile. It then exits and this procedure is completed. If you want to reconfigure the access point, select **Yes**.
11. The next page is displayed. The first field shows the name of the access point. This is by default the **Network Name (SSID)**. For example, MyWPS. You can name it whatever you want.
12. The next field in the panel below is the **Security Type**. Select the security type you want.
 - WPA Personal requires manual configuration of a pre-shared key (PSK) on the access point and clients. This PSK authenticates a password or identifying code, on both the client station and the access point. An authentication server is not needed.
 - WPA2 is the second generation of WPA security that provides enterprise and consumer wireless users with a high level of assurance that only authorized users can access their wireless networks. Here we have selected WPA2 Personal security. You can use Intel PROSet/Wireless profiles to obtain the wireless network name (SSID) and WPA2 Personal pass phrase to use for a legacy device. See Section 6 Making Wireless Security Easy for more information.
13. The third field is the **Password (Key)**. The password shown is randomly generated or pre-configured, but you can change it to whatever password you want. However you should use a robust key for improved security. It must have between 8 and 63 characters. (This password will be entered later at the enrollee (computer) to give it access to this network.) When you have completed this step, click **Next**.

14. After the network receives the Ownership Password, you are notified that you have Successfully connected to <name of wireless network>. Click **Finish**. This process completes configuration of the access point and the registrar.
15. If you want to save these settings to a profile for future use by a legacy client, click Save wireless settings to: C:\<name of wireless network>. The profile settings are saved to a text file (txt) on your local hard drive. The file is saved to your local C:\ drive by default. Accept the default save location or click Browse to choose another location on your computer.

4.2.2 Connecting an Enrollee to a Network Access Point

Perform these steps to connect an enrollee to the network you just created. This assumes that the registrar computer is running Intel PROSet/Wireless.

1. At the enrollee you want to connect the network, the message below tells you that one or more access points with Wi-Fi Protected Setup capability is within range of your wireless computer. Click on this message. (Or, you can select the network from the Wireless Networks list in the Intel PROSet/Wireless main window.)
2. The Wireless Network Configuration start up page opens. Use the Available Networks list to select the network that you want to connect to (in this example it is MyWPS). Then click **Next**.
3. The Discovery panel opens. The enrollee that you want to connect to the network discovers the registrar for the network. Assuming that the Discovery process succeeds, the name of the registrar or access point is displayed.
4. The next page appears, displaying the Device Password (enrollee password). The password displayed at the enrollee is a unique, randomly generated temporary password for the enrollee. This password is used to ask permission to connect to the network access point.
5. At the registrar, enter the password provided by the enrollee. Then click **Next**.



Note: This process assumes that the registrar is running PROSet/Wireless software; the process and windows displayed at the registrar may be different for software from other vendors. Some access points may have a built in registrar.

6. The next page lists the profile for this network. The selected profile will be sent to the enrollee, granting it access to the network. Only supported profiles are displayed. Supported profiles are those based on WPA-PSK, WPA2-PSK, and Open (None) security. Select the profile and click **Next** to finalize the enrollment process.
7. Click **Finish**.
8. At the enrollee, click **Next**. At the enrollee, you are notified when you have Successfully connected to <name of wireless network>. Click **Finish**.

4.2.3 Adding an Enrollee to an Existing Network at the Registrar

This following procedure lets you add an enrollee to an existing network, where the access point is already configured and the registrar has already joined the AP.



Note: This process assumes that the registrar is running PROSet/Wireless; the process and windows displayed at the registrar may be different for software from other vendors.

1. Get the Device Password for the enrollee computer that you want to add to the network.
2. At the task tray icon for PROSet/Wireless, right-click and select Add New Device.
3. Perform steps 5 through 8 of the procedure Connect an Enrollee to a Network or Access Point.

4.3 Connecting to Home or Small Business Wireless Networks

If your wireless network is already configured, to connect to non-secure or secure home and small business wireless networks using WEP, WPA-Personal and WPA2-Personal security for the first time:

1. Double-click the desktop alert to open the Intel(R) PROSet/Wireless main window, which displays all available wireless networks in range and available for user connections.

Secure networks are indicated by a lock. Accessing these networks requires a password, which is also called a pre-shared key (PSK).

2. Select the network from the Wireless Networks list, and then click **Connect**.

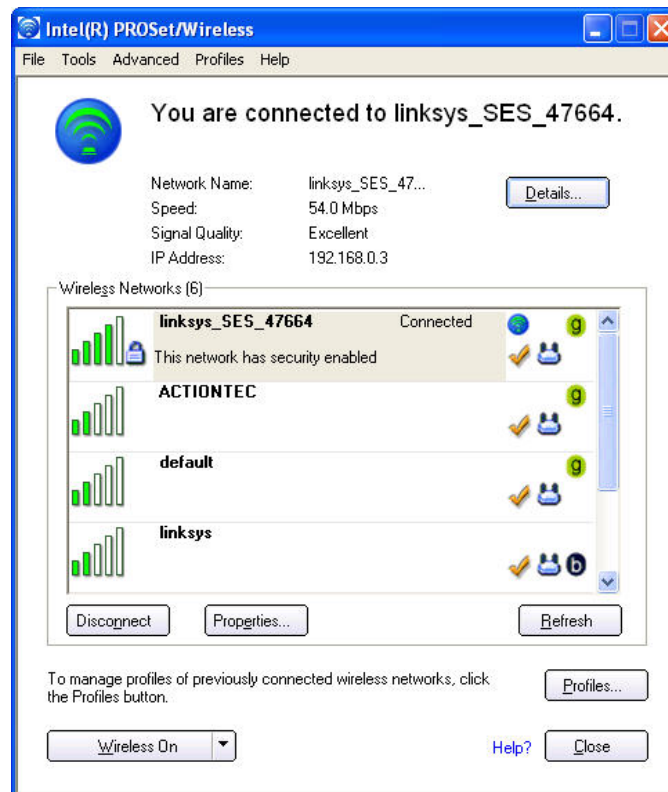
If you are accessing a secure WLAN, enter your password in the **Wireless Security Password (Encryption Key)** field in the dialog box that displays before allowing access to the secure wireless network.

3. Click **OK**.

Once you are connected, a balloon dialog appears above the Task Tray. A connected icon and **Connected** displays in the selected network in the **Wireless Networks** list (Figure 15). The Status icon in the Intel(R) PROSet/Wireless window (top left) animates and turns green. Connection information including network name, speed, signal quality, and IP address are displayed at the top of the window. The **Connect** button changes to **Disconnect**.

A profile that includes all the required network access and security settings is automatically created. The next time you are in range of this network, the PROSet/Wireless connection manager automatically connects to the network.

Figure 15: Connected to a Wireless Network



4.4 Connecting to Wireless Enterprise Networks

In a typical enterprise wireless network environment, an IT administrator creates profiles using the Administrator Tool. These Administrator Profiles are installed on PROSet/Wireless clients. Users simply use these profiles to automatically make secure wireless connections when they're in range. Profiles created with the Administrator Tool take priority on the wireless client when the corporate network is available. Administrator Profiles enable IT administrators to configure advanced connection profiles for Persistent, Pre-Logon (Single Sign On), and VoIP connections. These profiles can be used to configure PROSet/Wireless clients for Cisco WLAN environments.

4.4.1 Making Persistent, Pre-Logon, and VoIP Connections

The Administrator Tool allows IT administrators to create Administrator Profiles that support the use of a single set of credentials to authenticate the user to both the WLAN network and the machine/domain. Single Sign-On (SSO) integrates the entire login process so that a single set of credentials authenticates a user to the wireless network and to the machine/domain during the Microsoft Windows login session. User credentials are captured and passes to the wireless AP then to the RADIUS server and Active Directory.

SSO profiles created using the Administrator Tool enable the use of Persistent and Pre-Logon connections from the PROSet/Wireless client. A Persistent profile maintains a wireless connection either until the computer is turned off or a different user logs on. Pre-Logon/Common profiles are applied prior to a user log on. If Single Sign On support is installed, the profile is applied and connection is made prior to the Windows log on sequence (pre-logon).

PRO/Set Wireless and the 4965AGN also support VoIP connections using features to enable support third-party VoIP soft-phone applications and Cisco WLAN VoIP features.

4.4.2 Connecting to a Cisco Wireless Network

Built-in support for Intel/Cisco Business Class Wireless Suite v1.0 and Cisco Compatible Extensions v.4 enable the PROSet/Wireless client to support the latest Cisco WLAN infrastructure features such as enhanced VoIP quality and optimal AP selection. IT administrators can create profiles using the Administrator Tool to take full advantage of Cisco WLAN wireless environments.



Note: The 4965AGN supports Intel/Cisco Business Class Wireless v1.0 and v2.0 as well as Cisco Compatible Extensions v.4 features.

4.5 Connecting to Silent Mode Wireless Networks

The PROSet/Wireless connection manager detects silent mode wireless networks where the APs or wireless routers have been configured to not broadcast the SSID. If a wireless network is displayed in the Wireless Networks list as *<SSID not broadcast>*, the wireless network is operating in silent mode. Attempting to connect to a silent mode network displays the PROSet/Wireless Profile Wizard to configure a profile for accessing the network.

4.6 Monitoring Wireless Connectivity

When you are connected to a wireless network, clicking the **Details** button displays the Connection Details window that provides detailed connection information (Figure 16). Clicking the **Repair** button renews the IP address if you are having trouble accessing a network.

Figure 16: Connection Details




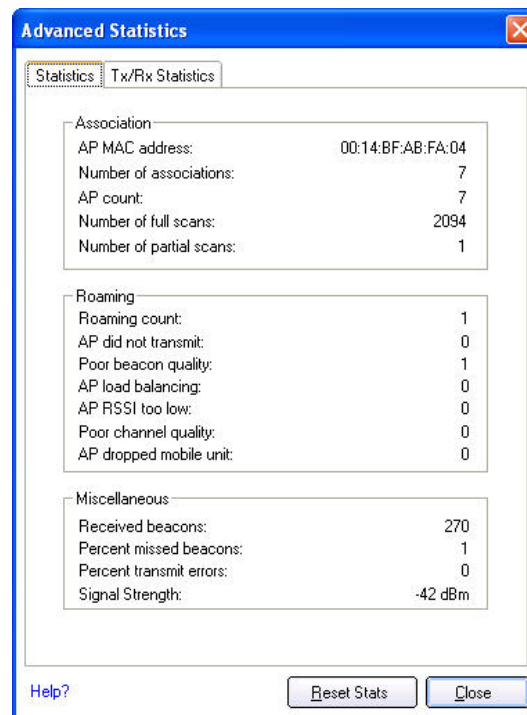
 **Tip:** You can display the signal strength of an AP by selecting **Advanced > Advanced Statistics** in the Intel(R) PROSet/Wireless window. In the Advanced Statistics window (Figure 17), the **Signal Strength** option displays the signal strength in dB (RSSI), which you can use as a guide for adjusting the antenna(s) of your AP to improve signal strength.

Figure 17: Advanced Statistics

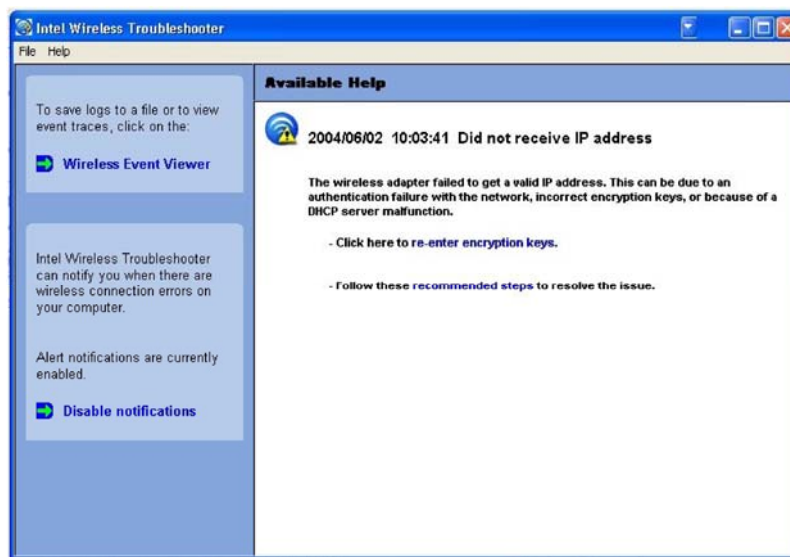


4.7 Using Intel® Wireless Troubleshooter

The Intel Wireless Troubleshooter helps users resolve wireless network connection issues. When a connection issue is detected, a desktop alert appears at the bottom right corner of your desktop screen. Once you click on the desktop alert, a diagnostic message displays the steps recommended to resolve the connection issue. For example, if a connection issue occurred because of an invalid password, the Profile Wizard application is launched when you click on a displayed hyperlink.

The Intel Wireless Troubleshooter (Figure 18) displays the current connection issue and the recommended action. The recommended action contains descriptions about available utilities and helps to resolve the associated connection issue. If the user clicks on a help link, the help text is displayed in a window. If the user clicks on the associated issue resolution link, a program is launched to resolve the connection issue.

Figure 18: Intel® Wireless Troubleshooter

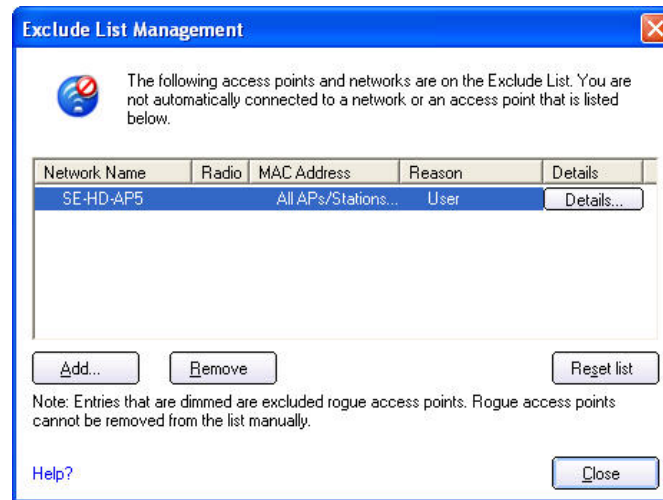


4.8 Excluding Wireless Networks

In any given location there may be a number of available wireless networks detected by the PROSet/Wireless connection manager. You can easily exclude networks whenever they are in range. This prevents you from accidentally connecting to another network such as a neighbor's wireless network at home. Excluded networks still appear in the list but they're dimmed and a red X symbol is displayed next to the network to show it has been excluded.

To add a wireless network to the Exclude List, simply right-click the network in the Wireless Networks list, then select **Add to Exclude List**. The entry is removed from the Wireless Networks list. You can manage your Exclude List by selecting **Profiles > Manage Exclusions**, which displays the Exclude List Management window (Figure 19).

Figure 19: Exclude List Management



5 Simplifying Wireless Network Access with Profiles

In this Section

- [Profiles Overview](#)
- [Connecting to Wireless Networks using Profiles](#)
- [Prioritizing Profiles](#)
- [Creating Profiles with the Profile Wizard](#)
- [Configuring Advanced Settings](#)
- [Managing Profiles](#)

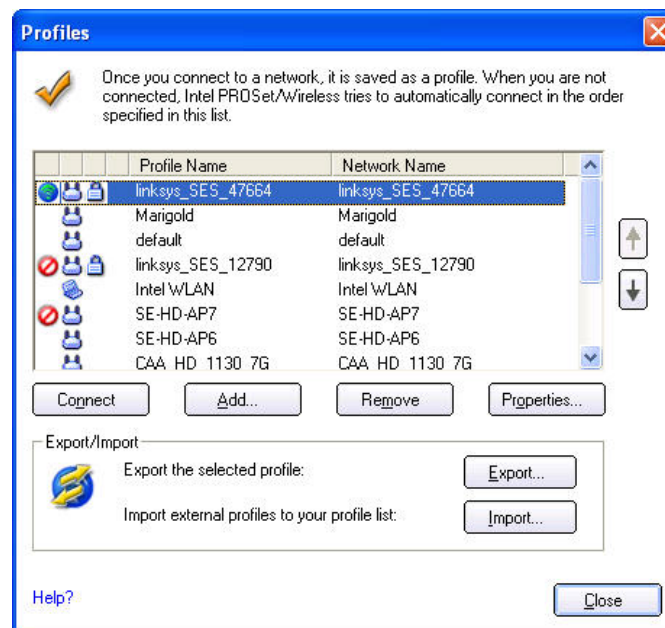
5.1 Profiles Overview

Profiles are at the heart of seamless wireless networking. They enable users to easily move from one wireless network to another. A profile is a saved group of network and security information needed to make connections to wireless networks. PROSet/Wireless profiles can be created in several ways:


- Establishing a connection to a non-secure and secure wireless network using WEP, WPA-Personal and WPA2-Personal security for the first time. A profile is automatically created and saved.
- Creating a new profile using the Profile Wizard.
- Using the Administrator Tool to create Administrator Profiles that include advanced network access features such as Persistent Connection and Pre-Logon profiles as well as specialized VoIP features. The Administrator Tool uses the Profile Wizard to configure profiles.

Clicking the **Profiles** button in the Intel(R) PROSet/Wireless window displays the Profiles window (Figure 20). This window provides all the tools to manage your wireless network profiles.

Figure 20: The Profiles window



5.2 Connecting to Wireless Networks using Profiles

If a profile already exists for any detected network, a checkmark  is displayed next to the wireless network entry in the Wireless Networks list in the Intel(R) PROSet/Wireless window. Depending on the profile configuration, when the PROSet/Wireless connection manager comes within the range of a wireless network that has a matching profile, it automatically connects to that network. The first available profile as ranked in the Profiles list is used. You can also manually connect to any network by selecting the profile in the Profiles list and clicking **Connect**. Once you're connected, this button changes to **Disconnect**.

5.3 Prioritizing Profiles

When the PROSet/Wireless connection manager detects available networks, it scans the Profiles list for the first available network profile from the top down. Profiles with the highest priorities are at the top of the Profiles list. The Profiles list allows you to prioritize your wireless network connections. A profile priority can be easily adjusted higher or lower by selecting the profile and using the up and down arrow buttons in the Profiles window.

Pre-Logon/Common Administrator Profiles always appear at the top of the profiles list. The user can still prioritize their own profiles that they have created but they cannot reprioritize Pre-Logon/Common Administrator Profiles. Since these profiles appear at the top of the Profiles list, the PROSet/Wireless connection manager attempts to connect to these profiles first before any user created profiles. If a new Administrator Profile is distributed and installed, the previous Administrator Profile is removed.

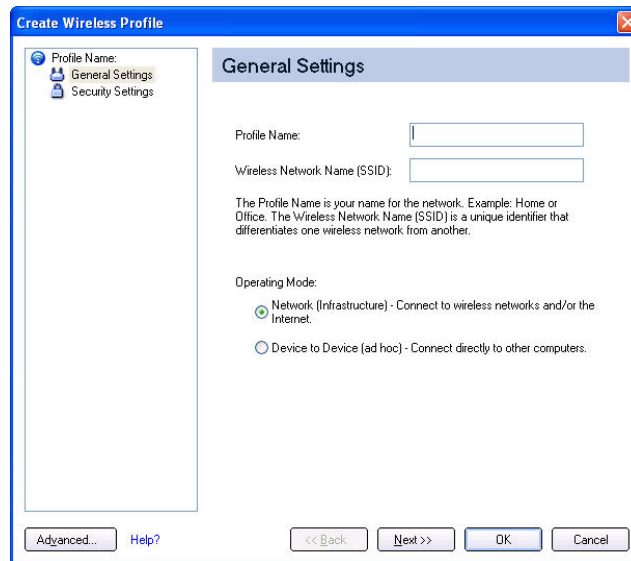
5.4 Creating Profiles with the Profile Wizard

Users can easily create their own profiles using the Profile Wizard. IT administrators can also use the Profile Wizard to create profiles for enterprise environments. These profiles do not have the advanced connection features available in Administrator Profiles created using the Administrator Tool. These profiles can be distributed to PROSet/Wireless clients for importing.

To create a new profile:

1. In the Profiles window, click the **Add** button. The Profile Wizard displays the **General Settings** page (Figure 21).
2. Enter a profile name in the **Profile Name** field. This name displays in the Profile list.
3. Enter SSID for the wireless network AP in the **Wireless Network Name (SSID)** field.
4. Use the selected **Network (Infrastructure) – Connect to wireless networks and/or the Internet** option in **Operating Mode**.
5. Click **Next**. The **Security Settings** page is displayed (Figure 22).
6. Configure the security settings. The **Security Settings** page allows users to configure **Personal Security** for home or small business networks, or **Enterprise Security** settings. See **Section 6 Making Wireless Security Easy** for information on security configuration options.
7. Clicking the **Advanced** button displays the Advanced Settings window (Figure 23). You can specify options for the profile, such as automatically connecting to the profile when the network is available, or specifying a password to restrict network access using the profile. For more information, see **Section 5.5 Configuring Advanced Settings**.
8. Click **Next**.
9. Click **OK** to connect to the wireless network.

Figure 21: Profile Wizard – General Settings

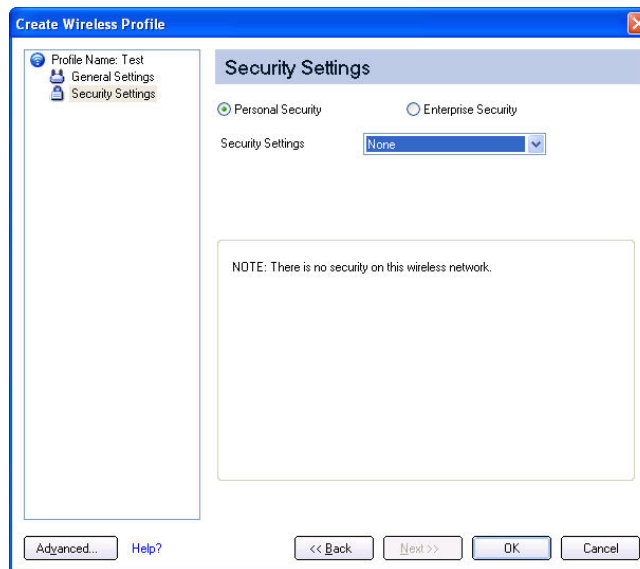


The screenshot shows the 'Create Wireless Profile' dialog box with the 'General Settings' tab selected. The left sidebar contains three items: 'Profile Name:', 'General Settings', and 'Security Settings'. The main area has the following fields and options:

- Profile Name:** A text input field.
- Wireless Network Name (SSID):** A text input field.
- The Profile Name is your name for the network. Example: Home or Office. The Wireless Network Name (SSID) is a unique identifier that differentiates one wireless network from another.**
- Operating Mode:**
 - ☒ **Network (Infrastructure)** - Connect to wireless networks and/or the Internet.
 - ☐ **Device to Device (ad hoc)** - Connect directly to other computers.

At the bottom, there are buttons for 'Advanced...', 'Help?', '<< Back', 'Next >>', 'OK', and 'Cancel'.

Figure 22: Profile Wizard – Security Settings



The screenshot shows the 'Create Wireless Profile' dialog box with the 'Security Settings' tab selected. The left sidebar contains three items: 'Profile Name: Test', 'General Settings', and 'Security Settings'. The main area has the following fields and options:

- Personal Security** (selected) and **Enterprise Security** (unselected) radio buttons.
- Security Settings:** A dropdown menu currently showing 'None'.
- NOTE:** There is no security on this wireless network.

At the bottom, there are buttons for 'Advanced...', 'Help?', '<< Back', 'Next >>', 'OK', and 'Cancel'.

5.5 Configuring Advanced Settings

The Advanced Settings window (Figure 23) allows you to configure a profile with handy features. Table 4 describes the available options.

Figure 23: Profile Wizard – Advanced Settings

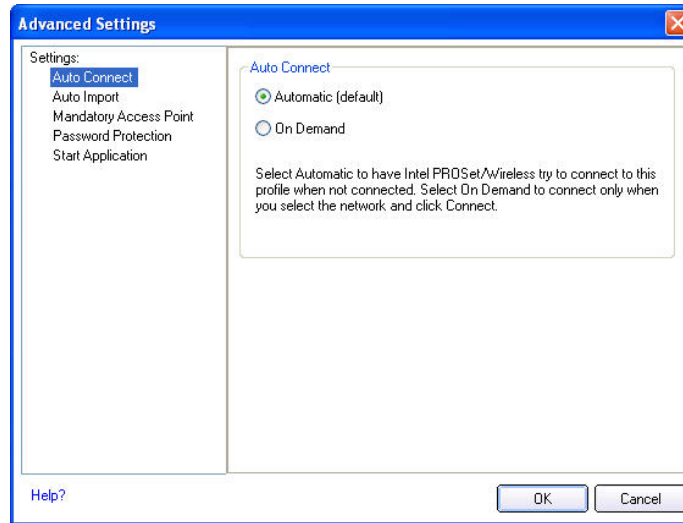


Table 4: Advanced Settings options

Setting	Description
Auto Connect	<p>Automatic (Default): PROSet/Wireless automatically connects to this profile when it's in range.</p> <p>On Demand: Prevents automatic connection of the profile when the network is in range. For example, if there is a cost for a wireless connection and you do not want to connect automatically when in range.</p>
Auto Import	Allows a network administrator to easily move the selected profile to other computers. When the exported file is placed in the Wireless\AutoImport directory on another computer, PROSet/Wireless automatically imports the profile.
Mandatory Access Point	Forces the wireless adapter to connect to an access point that uses a specific MAC address.
Password Protection	Prevents unauthorized users from editing and removing the profile.
Start Application	Automatically launches the specified program whenever you connect to a wireless network using the profile. For example, starting a VPN session automatically whenever you connect to the wireless network.



5.6 Managing Profiles

The Profiles window includes options for managing your profiles including editing, removing, importing and exporting profiles.

- Selecting a profile and clicking **Properties** displays the Profile Wizard with the existing profile settings. You can edit these settings.
- Selecting a profile and clicking **Remove** deletes the profile.
- Selecting a profile or multiple profiles and clicking **Export** button allows you to save the profiles as a file to import into another PROSet/Wireless connection manager. You can also import profiles by clicking the **Import** button.

6 Making Wireless Security Easy

In this Section

- [Personal and Enterprise Wireless Security](#)
- [Configuring Personal Security](#)
- [Configuring Enterprise Security](#)
- [Configuring Cisco Security Settings](#)

6.1 Personal and Enterprise Wireless Security

The PROSet/Wireless connection manager supports the latest security features including IEEE 802.11i, IEEE 802.1x, and certified Wi-Fi Alliance WPA2-Personal and WPA-Enterprise security for advanced wireless protection. PROSet/Wireless also supports Cisco Compatible Extensions security enhancements for secure Cisco WLAN infrastructures.

The PROSet/Wireless connection manager divides security configuration options in the Profile Wizard into **Personal Security** and **Enterprise Security**. Personal Security configurations provide security for home or small business wireless networks. Enterprise Security configurations provide additional advanced 802.1x authentication-based security that use an authentication server such as a RADIUS server. Enterprise authentication verifies the identity of a user logging onto a network. Passwords, digital certificates, smart cards and biometrics are used to prove the identity of the client to the network.



Note: For home or small office wireless networks, you can use Wi-Fi Protected Setup to setup a secure wireless network. See Section 4.2 Using Wi-Fi Protected Setup to Configure or Join a Network.

6.2 Configuring Personal Security

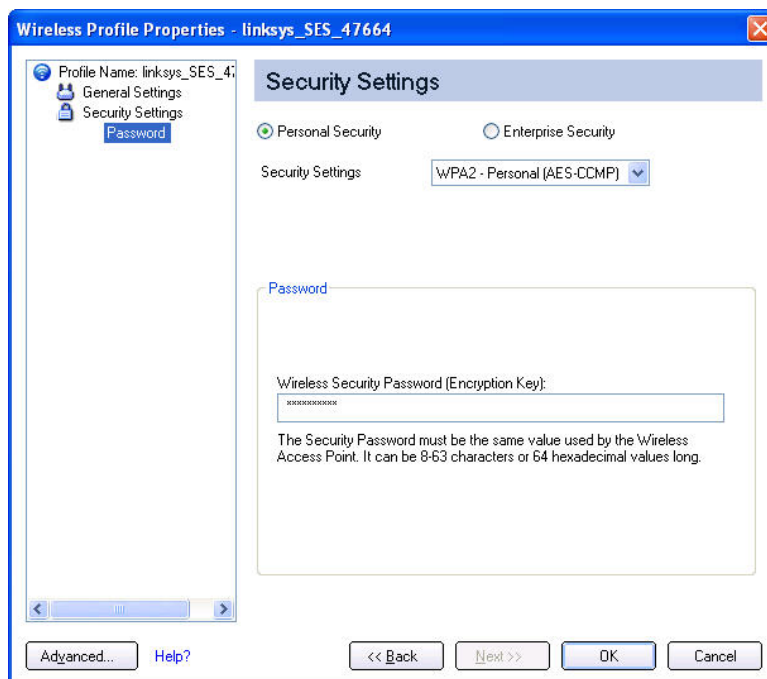
The PROSet/Wireless client makes secure wireless networking for home and small business environments easy. For home and small business wireless network environments, the PROSet/Wireless connection manager supports the security options described in Table 5. With the wireless AP configured with any of these security options, the PROSet/Wireless connection manager automatically configures these security settings in the profile; no manual configuration required. All the user needs is the wireless network password.

Configuration of a profile with security settings is easy using the Profile Wizard. Select the security option from **Security Settings** menu on the **Security Settings** page. When you select a security option, the Wireless Security Password (Encryption) field is displayed for entering the wireless network access password (Figure 24).

Table 5: Personal Security Options

Security Option	Description
WEP 64-bit	Wired Equivalent Privacy (WEP) is an early security protocol for wireless networks defined in the 802.11b standard. A network key or password is used for encryption. This early 64- and 128-bit low-level encryption algorithm is vulnerable to network attacks.
WEP 128-bit	
WPA-Personal (TKIP)	Wi-Fi Protected Access-Personal (WPA-Personal) is a security enhancement that strongly increases the level of data protection and access control to a wireless network. WPA was an interim standard that is replaced with the IEEE's 802.11i standard. WPA uses Temporal Key Integrity Protocol (TKIP) which fixed security flaws of WEP. Advanced Encryption Standard – Counter CBC-MAC Protocol (AES-CCMP) is a new privacy protection method specified in the IEEE 802.11i standard. It provides stronger encryption than TKIP. Because WPA-Personal is targeted to home and small business environments, no authentication server is needed. WPA is not compatible with WPA2.
WPA-Personal (AES-CCMP)	
WPA2-Personal (TKIP)	Wi-Fi Protected Access 2-Personal (WPA2-Personal) dramatically increases the level of data protection and access control to a wireless network. WPA2 complies with the IEEE 802.11i security standard. WPA2 consists of Advanced Encryption Standard (AES) encryption, pre-authentication and PMKID caching. It provides support for BSS (Infrastructure) mode and IBSS (Ad hoc) mode. WPA2-Personal uses a pre-shared key (PSK) on the access point and clients. PSK authenticates users via a password, or identifying code, on both the client station and the access point. Because WPA-Personal is targeted to home and small business environments, no authentication server is needed. WPA2 is not compatible with WPA.
WPA2-Personal (AES-CCMP)	

Figure 24: Personal Security Settings in the Profile Wizard



Wireless Profile Properties - linksys_SES_47664

Profile Name: linksys_SES_47664

General Settings
Security Settings
Password

Security Settings

☒ Personal Security ☐ Enterprise Security

Security Settings: WPA2 - Personal (AES-CCMP)

Password

Wireless Security Password (Encryption Key):
xxxxxxxxxx

The Security Password must be the same value used by the Wireless Access Point. It can be 8-63 characters or 64 hexadecimal values long.

Advanced... Help? << Back Next >> OK Cancel



6.3 Configuring Enterprise Security

The **Enterprise Security** settings in the Profile Wizard (Figure 25) provide comprehensive security settings for the PROSet/Wireless client operating in the enterprise environment. Beyond the WEP, WPA-Personal and WPA2 Personal options used for Personal Security configuration, Enterprise Security settings include network authentication, data encryption, and authentication options described in Table 6. PROSet/Wireless also supports Cisco Compatible Extensions security enhancements for secure Cisco WLAN infrastructures.

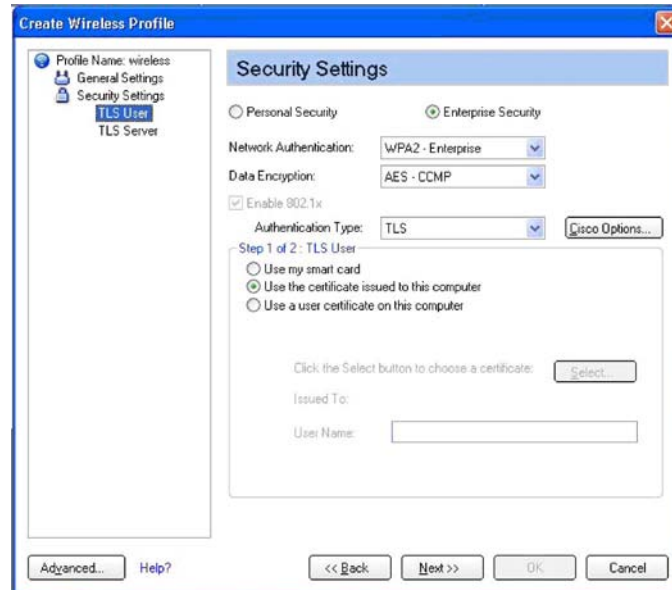
Table 6: Enterprise Security Options

Security	Description
Network Authentication	
WPA-Enterprise	<p>Wi-Fi Protected Access-Enterprise applies to corporate users. A new standards-based, interoperable security technology for wireless LAN (subset of IEEE 802.11i draft standard) that encrypts data sent over radio waves. WPA is a Wi-Fi standard that was designed to improve upon the security features of WEP as follows:</p> <p>Improved data encryption through the temporal key integrity protocol (TKIP). TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys have not been tampered with.</p> <p>User authentication, which is generally missing in WEP, through the extensible authentication protocol (EAP). WEP regulates access to a wireless network based on a computer's hardware-specific MAC address, which is relatively simple to be sniffed out and stolen. EAP is built on a more secure public-key encryption system to ensure that only authorized network users can access the network.</p>
WPA2-Enterprise	<p>Wi-Fi Protected Access-Enterprise is similar to WPA-2 Personal but provides support for user verification through a RADIUS or other authentication server supporting the IEEE 802.1x standard. An authentication type is selected to match the authentication protocol of the 802.1x server. The 802.1x standard provides a framework for authentication and key-management protocols.</p> <p>Wi-Fi Protected Access 2 (WPA2). This is the second generation of WPA that complies with the IEEE TGi specification. WPA2 consists of AES encryption, pre-authentication and PMKID caching. It provides support for BSS (Infrastructure) mode and IBSS (Ad hoc) mode. WPA2 is not compatible with WPA.</p>
Data Encryption	
CKIP	Cisco Key Integrity Protocol (CKIP) is a Cisco proprietary security protocol for encryption in 802.11 media. CKIP uses a key message integrity check and message sequence number to improve 802.11 security in infrastructure mode. CKIP is Cisco's version of TKIP.
TKIP	Temporal Key Integrity protocol improves data encryption. Wi-Fi Protected Access utilizes TKIP. TKIP provides important data encryption enhancements including a re-keying method. TKIP is part of the IEEE 802.11i encryption standard for wireless LANs. TKIP is the next generation of WEP, the Wired Equivalency Protocol, which is used to secure 802.11 wireless LANs. TKIP provides per-packet key mixing, a message integrity check and a re-keying mechanism, thus fixing the flaws of WEP.
AES-CCMP	Advanced Encryption Standard - Counter CBC-MAC Protocol is the new method for privacy protection of wireless transmissions specified in the IEEE 802.11i standard. AES-CCMP provides a stronger encryption method than TKIP.



Security	Description
Authentication Types	
EAP-SIM	Extensible Authentication Protocol-Subscriber Identity Module (EAP-SIM) authentication. A SIM card is a special smart card that is used by GSM-based digital cellular networks. The SIM card is used to validate your credentials with the network.
TLS	Transport Layer Security. A type of authentication method using the Extensible Authentication Protocol (EAP) and a security protocol called the Transport Layer Security (TLS). EAP-TLS uses certificates which use passwords. EAP-TLS authentication supports dynamic WEP key management. The TLS protocol is intended to secure and authenticate communications across a public network through data encryption. The TLS Handshake Protocol allows the server and client to provide mutual authentication and to negotiate an encryption algorithm and cryptographic keys before data is transmitted.
TTLS	Tunneled Transport Layer Security. These settings define the protocol and the credentials used to authenticate a user. In TTLS, the client uses EAP-TLS to validate the server and create a TLS-encrypted channel between the client and server. The client can use another authentication protocol, typically password-based protocols, over this encrypted channel to enable server validation. The challenge and response packets are sent over a non-exposed TLS encrypted channel. TTLS implementations today support all methods defined by EAP, as well as several older methods (CHAP, PAP, MS-CHAP and MS-CHAPv2). TTLS can easily be extended to work with new protocols by defining new attributes to support new protocols.
PEAP	Protected Extensible Authentication Protocol (PEAP) is an Internet Engineering Task Force (IETF) draft protocol sponsored by Microsoft, Cisco, and RSA Security. PEAP creates an encrypted tunnel similar to the tunnel used in secure web pages (SSL). Inside the encrypted tunnel, a number of other EAP authentication methods can be used to perform client authentication. PEAP requires a TLS certificate on the RADIUS server, but unlike EAP-TLS there is no requirement to have a certificate on the client. PEAP has not been ratified by the IETF. The IETF is currently comparing PEAP and TTLS (Tunneled TLS) to determine an authentication standard for 802.1X authentication in 802.11 wireless systems. PEAP is an authentication type designed to take advantage of server-side EAP-Transport Layer Security (EAP-TLS) and to support various authentication methods, including user's passwords and one-time passwords, and Generic Token Cards.
LEAP	Light Extensible Authentication Protocol. A version of Extensible Authentication Protocol (EAP). LEAP is a proprietary extensible authentication protocol developed by Cisco, which provides a challenge-response authentication mechanism and dynamic key assignment.
EAP-FAST	EAP-FAST, like EAP-TTLS and PEAP, uses tunneling to protect traffic. A server certificate is used to validate the server identity. A client certificate can optionally be used in CCCv4 when configuring EAP-FAST to use TLS as the inner method.

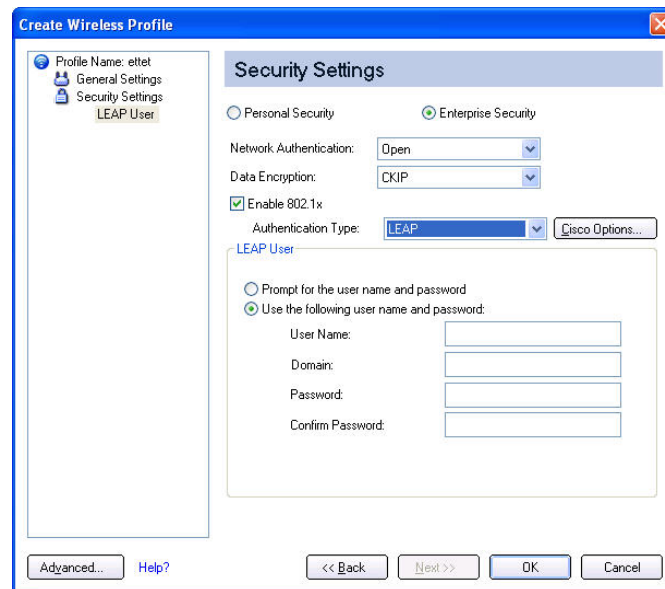
Figure 25: Enterprise Security Settings



6.4 Configuring Cisco Security Settings

PROSet/Wireless supports Cisco Light EAP (Cisco LEAP), Cisco Key Integrity Protocol (CKIP), EAP-FAST security features (see Table 6 Enterprise Security Options) as well as Cisco Rogue Access Point, Fast Roaming using Cisco Centralized Key Management (CCKM), and Mixed-Cell Mode features. Table 7 describes these Cisco configuration options available for Cisco configuration options in Security Settings (Figure 26).

Figure 26: Cisco Security Configuration

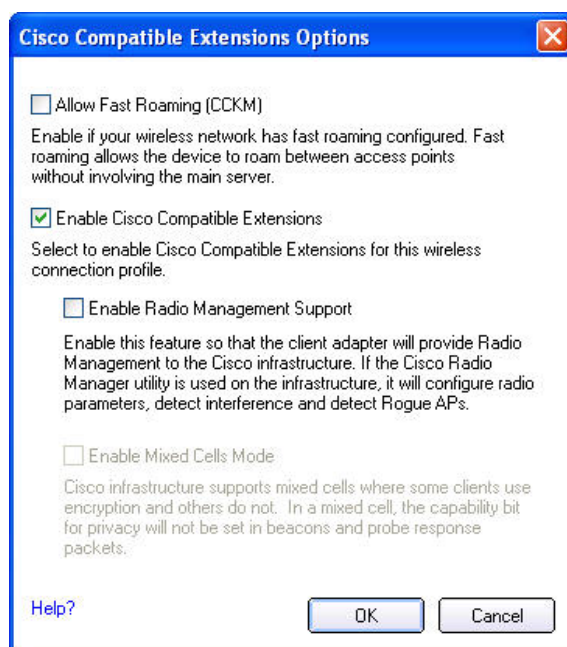


Clicking on the **Cisco Options** button in the Security Settings page of the Profile Wizard displays the Cisco Compatible Extensions Options window (Figure 27) that allows you to take advantage of Cisco WLAN enhancements described in Table

Table 7: Cisco Compatible Extensions Options

Option	Description
Allow Fast Roaming (CCKM)	Fast roaming allows the device to roam between access points without involving the main server. Enabled if the Cisco wireless network is configured for fast roaming.
Enable Cisco Compatible Extensions	Select to enable Cisco Compatible Extensions for this wireless connection profile. Enabled by default.
Enable Radio Management Support	Enable this feature so that the client adapter will provide Radio Management to the Cisco infrastructure. If the Cisco Radio Manager utility is used on the infrastructure, it configures radio parameters.
Enable Mixed Cells Mode	Use this feature if a Cisco infrastructure supports mixed cells where some clients use encryption and others do not. In a mixed cell, the capability bit for privacy is not set in beacons and probe response packets.

Figure 27: Cisco Compatible Extensions Options



7 Managing Intel Wireless Clients in the Enterprise

In this Section

- [Intel® Active Management Technology](#)
- [Business Class Wireless Suite](#)
- [PROSet/Wireless Administrator Tool](#)

7.1 Intel® Active Management Technology

A major barrier to greater IT efficiency in wired and wireless network management is removed by Intel® AMT. Using built-in platform capabilities and popular third-party management and security applications, Intel AMT allows IT to better discover, heal, and protect their networked computing assets.

- **Discover** – Intel AMT stores hardware and software information in non-volatile memory. With built-in manageability, Intel AMT allows IT to discover the assets. With Intel AMT, remote consoles do not rely on local software agents, helping to avoid accidental data loss.
- **Heal** – Intel AMT includes built-in manageability that provides out-of-band management capabilities to allow IT to remotely heal systems after OS failures. Alerting and event logging help IT detect problems quickly to reduce downtime.
- **Protect** – Intel AMT features a System Defense capability that protects your network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting IT when critical software agents are removed. Intel AMT also helps to protect your network by making it easier to keep software and virus protection consistent and up-to-date across the enterprise. Third party software can store version numbers or policy data in non-volatile memory for off-hours retrieval or updates.



Note: Intel AMT supports Intel Centrino Pro processor technology notebook computers. For more information on Intel AMT, refer to <http://www.intel.com/technology/manage/iamt/>.

7.2 Business Class Wireless Suite

The Intel/Cisco Business Class Wireless Suite of features ensures full compatibility between the Intel wireless client and the Cisco WLAN infrastructure. Working closely with Cisco, the Intel wireless client provides the features that enable the enterprise to effectively deliver all data, voice and video over a Cisco WLAN infrastructure. Intel Centrino Duo processor technology fully integrates into the Cisco Unified Wireless Architecture.



Note: For more information on the Cisco Intel Alliance, visit <http://www.cisointelalliance.com>.

- **Enhanced VoIP Quality Technology** – Optimized feature set that takes advantage of 802.11e (WMM) and Cisco Compatible Extensions support to enhance VoIP quality technology with Cisco AP Infrastructure. These enhancements include:
 - **802.11e QoS support** – Enhances traffic prioritization of VoIP traffic.
 - **Hi-fidelity voice quality** – Enhances user VoIP experience over WLAN from improved voice traffic management.
 - **Wide-band codecs** – Enhances call quality between client-to-client soft phone calls from wideband codecs mapped to IEEE 802.11e QoS TSPECs.
 - **QoS statistics from AP to client station** – Delivers network traffic data to soft phones to enable dynamic adjustments for enhanced call quality.

- **Multi-vendor support** – Enhances VoIP deployment flexibility. Intel also enabled API extensibility to enable soft phone application vendors to take advantage of VoIP optimized WLAN feature set included in the PROSet/Wireless software.
- **Optimal AP Selection Technology** – Allows clients to proactively request neighbor lists from APs to initiate roaming to an optimal AP. This technology enables load balancing traffic across APs to improve client and network performance. When an AP becomes congested, the client get a neighbor list from the AP to allow the client to scan a small set of APs for the optimal wireless connection. Optimal AP Selection Technology also delivers more reliable multimedia and collaboration application experience by reducing channel scanning that negatively impacts QoS flows.
- **Cisco Compatible Extensions Support** – Takes full advantage of Cisco's WLAN infrastructure capabilities incorporated into version 4, including new security, mobility, QoS and performance management features.
- **Quality of Service** – The 4965AGN is Wi-Fi Multimedia* (WMM) certified to enhance voice and multimedia applications. The Wi-Fi Alliance's WMM is a subset of 802.11e, the IEEE standard for QoS. With QoS, time-sensitive multimedia and voice application traffic receives a higher priority, greater bandwidth and less delay than best-efforts data traffic. QoS controls jitter and latency for streaming media applications by managing network congestion with traffic shaping via prioritizing bandwidth for critical applications.
- **High Density Networking** – Included in Business Class Wireless Suite, version 2. High Density improves bandwidth utilization and aggregate network throughput by dynamically adjusting in APs and STAs (clients) based on the density of the APs within an office environment. High Density AP deployment allows higher capacity in a given area. In the digital office environment, the assumption is there are several Cisco APs for a highly dense population of client PCs to associate with. Each of the client PCs make an intelligent decision on which AP to associate. After association to the best AP, the client PC reports the range of each of the three statistical parameters that it can support. The client PC re-adjusts its parameters based on the AP information received. If the client PC needs to roam to a different AP, it first analyzes the High Density parameters of the new AP (from beacons received) along with full consideration of any applications that are currently in progress (i.e. VoIP call occurring, etc.). If the current AP suddenly makes a dynamic change to its high density parameters, then the client PC first considers its current activity (in progress) before re-adjusting its own high density parameters. In a fixed digital enterprise environment, it is expected that the AP changes its high density parameters only one or twice a day. All client PCs associated with a specific AP operate with the same high density parameters.



Note: The High Density feature requires Cisco APs with support for Business Class Wireless, version 2, in addition to the 4965AGN, PROSet/Wireless software v11.1, and other components.

7.3 PROSet/Wireless Administrator Tool

The Administrator Tool resolves the most pressing needs of enterprise IT administrators deploying wireless networks. It delivers an easy-to-use centralized wireless client configuration solution that eliminates tedious, time consuming, and costly setup of wireless clients. Included with the PROSet/Wireless software, the Administrator Tool enables IT administrators to achieve greater enforcement of corporate network and security policies.



Note: In Microsoft Windows Vista, access the Administrator Tool from the Start menu. You can also access the feature from the Network and Sharing Center or the Control Panel.

Using the Administrator Tool, IT administrators create Administrator Packages that can include Administrator Profiles, customized global and security application policies, Intel® PRO/Wireless Network Connection drivers, and custom PROSet/Wireless software installs. These packages are self-executing applications that can be distributed to clients on the network using third-party software distribution packages, pushed out via Microsoft GPO (Group Policy Objects) or SMS (Systems Management Server), or using less advanced methods such as e-mail or posting on an intranet server.

PROSet/Wireless software includes the Administrator Tool that delivers a comprehensive suite of powerful, yet easy-to-use tools for centralized configuration and management of wireless clients.

- **Package Creator** – Administrators create a complete client installation packages that can include connection profiles, driver and application software, security settings and more. These Administrator Packages eliminates the need to touch every machine. Administrators can distribute these packages using existing network software distribution tools.
- **Control Access with Administrator Profiles** – Advanced client profiles created by IT administrators using the Administrator tool ensure wireless clients comply with corporate policies when accessing the corporate network.
- **Remote Management** – “Lights-out” remote management via Persistent Connection enable WLAN connections to be maintained even when no user is logged in. Combined with Wake on WLAN (WoWLAN) support that allows remote wake up of notebooks, administrators can push critical security updates and other software to keep clients in compliance with corporate network policies.
- **Single Sign-On** – This feature set allows the IEEE 802.1x credentials to match Windows log on user name and password credentials for wireless network connections. The Administrator Tool allows administrators to create these profiles to streamline network access.
- **VoIP Support** – Provides support for third-party VoIP softphone applications to enable enhanced wireless VoIP communication connections.



Note: The Administrator Tool is an optional software component available during the **Custom** install of the PROSet/Wireless software. If it is not installed, install it using the Intel(R) PROSet/Wireless Installer.



Note: For more information, refer to the *Managing Wireless Clients with Administrator Tool* white paper available at:
http://www.intel.com/network/connectivity/products/wireless/proset/tech_docs_software.htm

7.3.1 Configuring Administrator Profiles

The Administrator Tool provides profile configuration features that enable IT administrators to create Administrator Profiles commonly used in enterprise environments. These advanced connection profiles incorporate Single Sign On (SSO) and VoIP capabilities as well as all network access and security settings required for wireless clients to comply with corporate policies. SSO-based Administrator Profiles are automatically installed at the top of the Profiles list in the PROSet/Wireless client to ensure compliance with global policies. They cannot be modified or removed by the user.

The Administrator Tool allows the IT administrator to create the following types of Administrator Profiles:

- **Persistent Profiles** – These profiles are applied at system power up or after a user logs off. A Persistent connection enables a wireless connection to be maintained regardless of whether users are logged onto the network. Combined with Wake on WLAN (WoWLAN) support that allows remote wake up of notebooks so administrators can push critical security updates and other software to keep clients in compliance with corporate network policies. Clicking the **Add** button for Persistent and Pre-Logon/Common profiles displays the Profile Wizard to configure general and security settings.
- **Pre-Logon/Common Profiles** – These profiles are applied prior to a user log on. If Single Sign On (SSO) support is installed (Pre-Logon support is installed during a Custom install of the PROSet/Wireless software), the profile is applied and connection is made prior to the Microsoft Windows log on sequence (pre-logon). This feature allows the IEEE 802.1x credentials to match Windows log on user name and password credentials for wireless network connections. The Pre-Logon/Common profile always appears at the top of a Profiles list in the PROSet/Wireless client.

- **Exclude** – Administrators can designate networks to be excluded from connection. Once a network is excluded, only an administrator can remove the network from the Exclude list.
- **Voice over IP (VoIP) Support** – The VoIP features allow administrators to configure PROSet/Wireless clients for voice transmissions over IP networks using codecs supported by third-party VoIP applications and Cisco APs. An administrator can configure various data rates and frame rates to improve voice quality in VoIP transmissions.
- **Configure Adapter Settings** – Allows administrators to configure adapter settings for Intel wireless clients. For example controlling Roaming Aggressiveness is a valuable feature in optimizing performance of wireless connection based on the specific network environment. An administrator can select values that provide optimal balance between roaming and performance.
- **Configuring Software Deployment** – Enables IT administrators to deploy PROSet Wireless with a customized configuration of components. The administrator can specify only the desired components of the software, rather than the entire solution. This selective install can be done several ways: via a single executable-type silent install, through command line parameters, or via an easy graphical user interface (GUI) which allows the user to check off the desired components. The administrator can also define the settings and policies that get enforced when the package has been pushed out.

7.3.2 Deploying Administrator Packages

Once administrators have created and saved Administrator Packages with connection profiles, custom policy settings, and PROSet Wireless Software driver and application configurations that meet their company's policies, they can easily save, copy, and export these self-extracting executable packages to clients on their network. When the executable runs on the destination machine, the new configuration is automatically updated. Upon launch of the installed package, the application checks the driver version to assure that a compatible driver is installed. This can be performed by means of a silent install option that requires minimal user intervention.

Administrators can distribute these packages using existing network software distribution tools. For Microsoft users applications like GPO (Group Policy Objects) or SMS (Systems Management Server) enables IT administrators to seamlessly and automatically push the updates to selected groups of clients or machines on their network. The .exe file generated with the Administrator Tool can be easily converted by the third party programs to the native .msi file format in order to be pushed out via GPO. Administrator can selectively copy the executable file to any user's computer in order to install the configuration that has been saved in the package. Administrators can also use third-party software distribution packages from LANDesk*, Computer Associates*, and Symantec*, etc to distribute these packages or less advanced distribution mechanisms such as e-mail or posting .exe files on the intranet server to deploy these packages.

Once this package is installed on the wireless client, the new Administrator Profile is automatically prioritized at the top of the PROSet/Wireless client's Profile list to enforce global network and security policies compliance. This profile can not be modified or deleted by the user.

8 Using PROSet/Wireless and 4965AGN on Microsoft Windows Vista

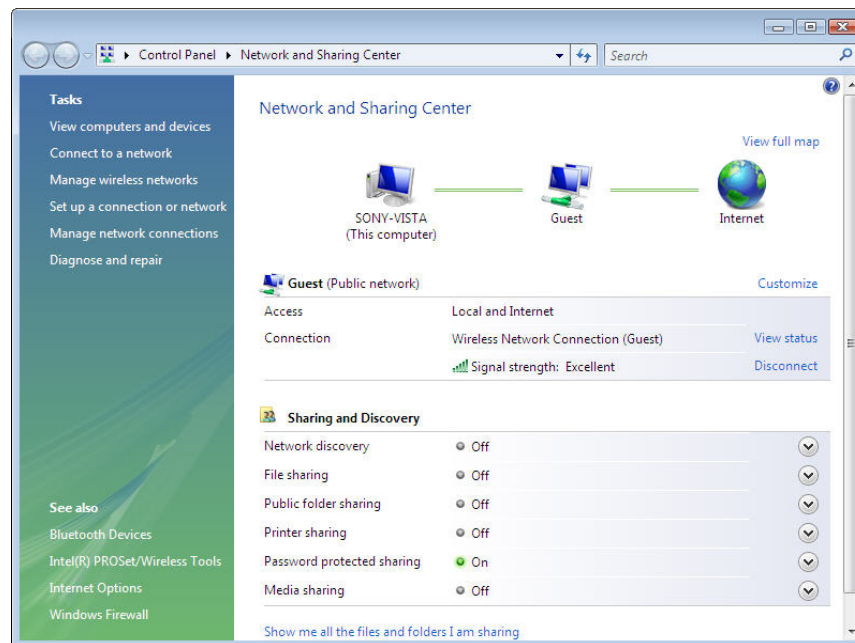
In this Section

- [Wireless Networking in Microsoft Windows Vista](#)
- [Importing PROSet/Wireless Profiles](#)
- [Accessing 4965AGN Properties](#)

8.1 Wireless Networking in Microsoft Windows Vista

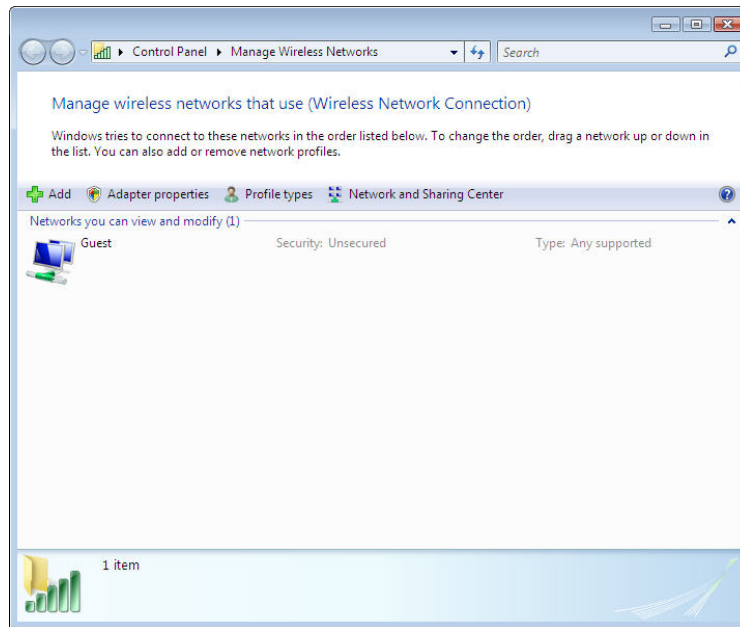
Wireless networking in Microsoft Windows Vista is centrally managed from the Network and Sharing Center (Figure 28).

Figure 28: Network and Sharing Center



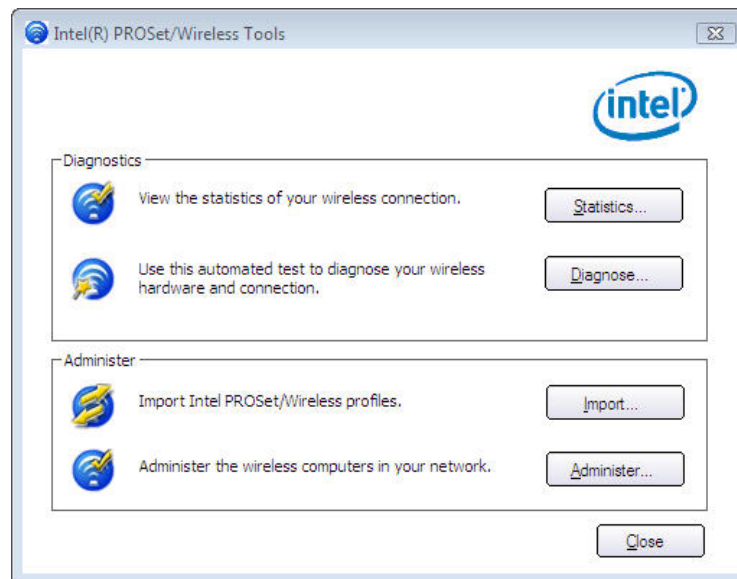
Wireless network profiles are created and managed in Manage Wireless Networks. Click **Manage wireless networks** in the Network and Sharing Center. The Manage Wireless Networks window is displayed (Figure 29).

Figure 29: Manage Wireless Networks



If PROSet/Wireless software is installed on Microsoft Windows Vista, click the Intel(R) PROSet/Wireless Tools link under See also in the Network and Sharing Center. The Intel(R) PROSet/Wireless Tools window is displayed (Figure 30).

Figure 30: Intel(R) PROSet/Wireless Tools Window



The Intel(R) PROSet/Wireless Tools window provides access to the following WLAN tools:

- **Statistics** – Displays the Intel(R) Advanced Statistics window for displaying the statistics of your current wireless connection, including General, Transmit/Receive, Association/Roaming and Logging.
- **Diagnose** – Displays the Manual Diagnostics Tools that allows you to run a set of diagnostics tests that verify the functionality of your wireless adapter and wireless connection. There are

two levels of diagnostics details represented in this tool: user level and technical support level. At the user level, the tool only shows a short description of the different diagnostics steps that are being taken and only shows a pass or fail indication for each step. The technical support level includes the creation of the log file which contains detailed information on all the excluded tests. This log file can be saved to a text file and emailed to a technical support department to troubleshoot connection problems.

- **Import** – Allows you to import and convert PROSet/Wireless software profiles from Microsoft Windows XP to Microsoft Windows Vista profiles.
- **Administer** – Accesses the PROSet/Wireless Administrator Tool. the Administrator Tool in Microsoft Windows Vista allows the user to create profiles for the Microsoft Windows Vista user for the computer or other computers. The Administrator Tool can be used by the person who has administrator privileges on the computer. The Administrator Tool is accessible from the Start menu or the Network and Sharing Center. The Create a Windows Vista Package allows you to create only EAP-TTLS and EAP-SIM Common profiles only.



Note: You can also access the Administrator Tool, Advanced Statistics, and Manual Diagnostics from the Microsoft Windows Vista Start menu.

8.2 Importing PROSet/Wireless Profiles

Importing PRO/Wireless profiles allows you to move your wireless profiles to Microsoft Windows Vista. To import PRO/Wireless profiles, perform the following steps:

1. Click **Import** in the Intel(R) PROSet/Wireless Tools window (see Figure 28). The Import Profiles window is displayed (Figure 31).
2. Navigate to the Intel(R) PROSet/Wireless profile files.
3. Select the profile(s), click **Import**. A dialogue window displays Successfully imported the Profile (Figure 32).
4. Click OK. Your imported profiles are available in the Manage Wireless Networks window (Figure 33).



Note: Not all profile types can be imported into Microsoft Windows Vista, such as PEAP, TLS, FAST and LEAP.

Figure 31: Import Profiles Window

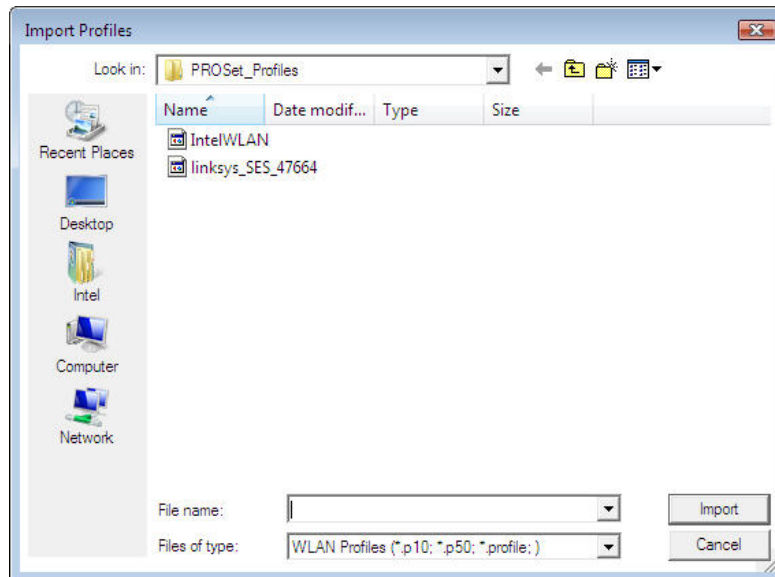
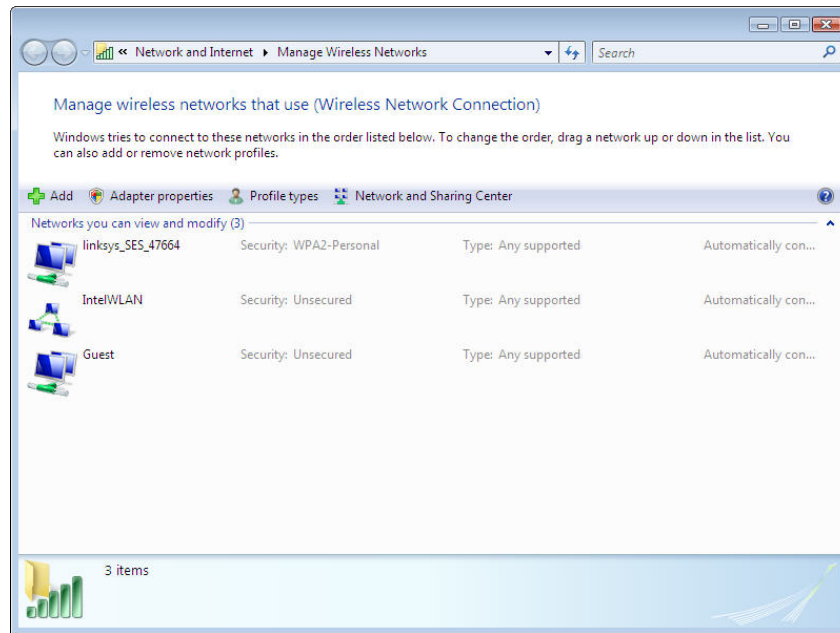


Figure 32: Successfully Imported Profiles



Figure 33: Manage Wireless Networks with Imported Profiles

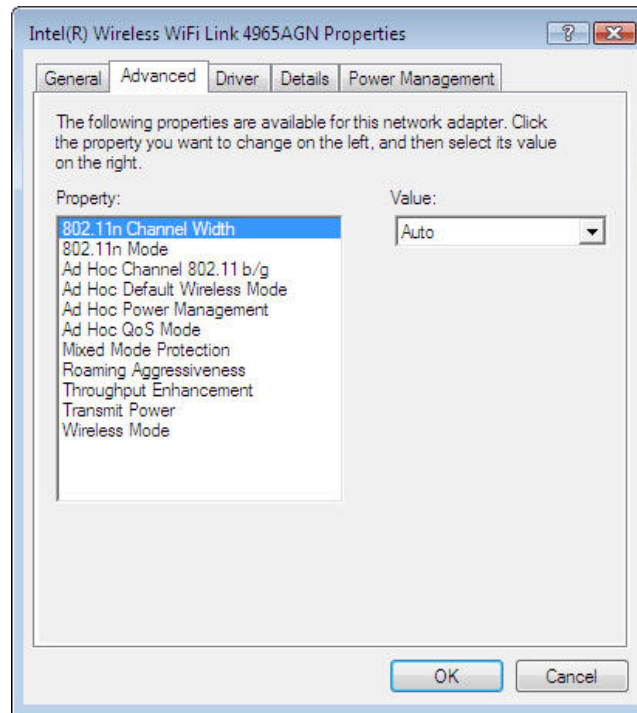


8.3 Accessing 4965AGN Properties

In the Manage Wireless Networks window, click **Adapter properties** to display the Wireless Network Connection window. Click **Configure** to display the Intel(R) Wireless WiFi Link 4965AGN Properties window. Click the **Advanced** tab (Figure 34). On the Advanced tab are two uniquely 802.11n settings for the 4965AGN adapter.

- **802.11n Channel Width** – Sets high throughput channel width to maximize performance. Set the channel width to Auto or 20Mhz. Auto is the default setting. Use 20Mhz if 802.11n channels are restricted.
- **802.11n Mode** – The 802.11n standard builds upon previous 802.1X standards by adding multiple-input multiple-output (MIMO). MIMO increases data throughput to improve transfer rate. Select Enabled or Disabled to set the 802.11n mode of the adapter. Enabled is the default setting. An administrator can enable or disable support for high throughput mode to reduce power-consumption or conflicts with other bands or compatibility issues.

Figure 34: Intel(R) Wireless WiFi Link 4965AGN Properties



9 Conclusion

Intel Centrino Duo processor technology with Intel Next-Gen Wireless-N delivers the next generation of mobile computing for the home, small or medium size business, or the enterprise. Based on the latest Wi-Fi breakthrough, Draft-N, Intel Wireless WiFi Link 4965AGN delivers up to five times the performance and two times the range of 802.11a/g networks. Combined with Connect with Centrino validation of wireless access points from leading AP manufacturers, Intel Wireless WiFi Link 4965AGN users connect with confidence.

Intel wireless clients support a comprehensive suite of client management tools including Intel Active Management Technology and the Intel PROSet/Wireless Administrator Tool. Intel AMT enables IT administrators to remotely access and manage every networked computing system, even systems where the operating system is inoperative, or the hard disk has crashed. The Administrator Tool included with the PROSet/Wireless software dramatically lowers the total cost of ownership (TCO) for wireless deployments and enables full compliance with corporate network and security policies.

Appendix A Installing PROSet/Wireless v11.x Software

In this Section

- [Installing PROSet/Wireless Software \(Microsoft Windows XP\)](#)
- [Installing PROSet/Wireless Software \(Microsoft Windows Vista\)](#)

A.1 Installing PROSet/Wireless (Microsoft Windows XP)

PROSet/Wireless software v11.x is available at <http://downloadfinder.intel.com>. It includes two software components, the Intel® PRO/Wireless adapter device driver and the PROSet/Wireless software.

To get the PROSet/Wireless software v11.x and install it on a Intel Centrino processor technology-enabled notebook:


1. Point your browser to <http://downloadfinder.intel.com>
2. Select **Wireless > Wireless LAN Products > Intel® PRO/Wireless adapter**.
3. Download the PROSet/Wireless software v11.x.
4. Unzip the application and double-click the **Autorun.exe** program.
5. Click **Install Software** on the **Intel(R) PROSet/Wireless Installer** screen (Figure 33).
6. Read the license agreement.
7. Select **I accept the terms in the license agreement**.
8. Click **Next**.
 **Note:** The **Typical** option installs the basic wireless client capabilities that include the Wireless LAN adapter driver, the PROSet/Wireless software, Intel Wireless Troubleshooter, and Intel® Smart Wireless Solutions.
9. Select the **Custom** option. Selecting **Custom** displays all the available software options with the Wireless LAN adapter driver, the PROSet/Wireless software, Intel Wireless Troubleshooter, and Intel Smart Wireless Solutions already selected (Figure 34).
10. Click the drop-down menu icon for the **Single Sign On, WMI Support, and Administrator Toolkit** options and select **Install this feature and any selected subfeatures**. The **X** changes to a checkmark. Table 1 provides a brief description of the software components listed in the Intel(R) PROSet/Wireless Installer window.
11. Click **Install**. The installed components are listed in the Intel(R) PROSet/Wireless Installer after the software is installed on your computer.
12. Click **OK**.

Figure 35: Intel(R) PROSet/Wireless Installer



Figure 36: Custom Install Options

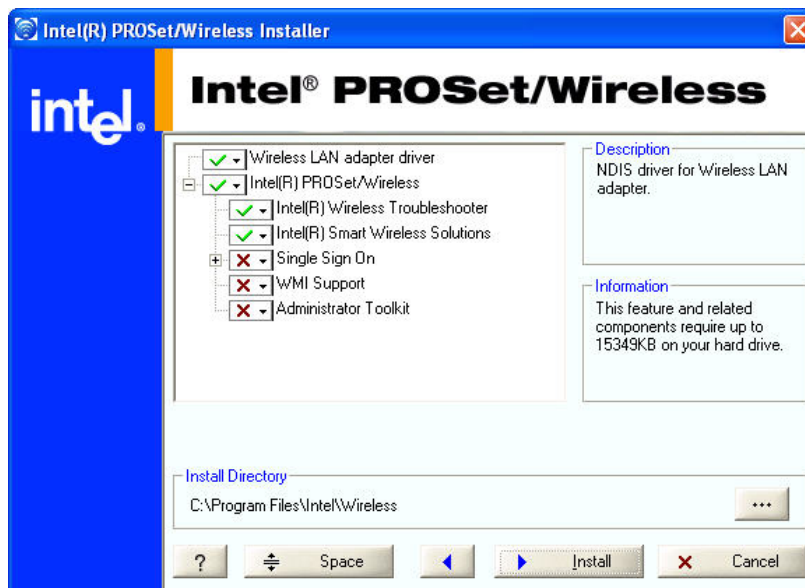


Table 8: PROSet/Wireless Installer Options

Component	Description
Wireless LAN adapter driver	The Microsoft Windows* operating system driver for the Intel® PRO/Wireless Network Connection adapter
Intel® PROSet/Wireless	The PROSet Wireless application that provides the user GUI
Intel® Wireless Troubleshooter	An intelligent application that helps users resolve wireless connection issues

Component	Description
Intel® Smart Wireless Solutions	Includes a set of features designed to simplify the end-user's wireless experience through simplified network configuration, management and troubleshooting. Includes the Wireless Network Configuration Wizard and the Wireless Security Assistant for use in small network environments.
Single Sign On	Installs the Single Sign On features. This tool is used to configure common (shared) profiles with the Administrator Tool. The Fast User Switching and the Microsoft Windows XP Welcome Screen are disabled when Single Sign On support is installed. Single Sign On is targeted to the enterprise environment where users logon to their computer with a user name, password and typically a domain. Fast User Switching does not support domain log on.
Pre-Logon Connect	A Pre-Logon profile is active once a user logs onto the computer. When Pre-Logon Connect is installed, you are asked to reboot after installation of the software.
WMI Support	Wireless Management Instrumentation functionality allows administrators who do not have PROSet/Wireless software installed to remotely manage clients that have the PROSet/Wireless software installed.
Administrator Toolkit	Installs the Administrator Tool for administrators to create shared wireless client profiles and customized PROSet/Wireless software installations for distribution in enterprise network environments.

A.2 Installing PROSet/Wireless (Microsoft Windows Vista)

To get the PROSet/Wireless software v11.x and install it on a Intel Centrino processor technology-enabled notebook:

1. Point your browser to <http://downloadfinder.intel.com>
2. Select **Wireless > Wireless LAN Products > Intel® PRO/Wireless adapter**.
3. Download the PROSet/Wireless software v11.x.
4. Unzip the application and double-click the **Autorun.exe** program.
5. Click **Install Software** on the **Intel(R) PROSet/Wireless Installer** screen.
6. Read the license agreement.
7. Select **I accept the terms in the license agreement**.
8. Click **Next**.



Note: The **Typical** option installs the basic wireless client capabilities that include the Wireless LAN adapter driver, the PROSet/Wireless software, Intel Wireless Troubleshooter, and Intel Smart Wireless Solutions.

9. Select the **Custom** option. Selecting **Custom** displays all the available software options with the Wireless LAN adapter driver, the PROSet/Wireless software, Intel Wireless Troubleshooter, and Intel Smart Wireless Solutions already selected (Figure 3).



10. Click the drop-down menu icon for the **Single Sign On, WMI Support, and Administrator Toolkit** options and select **Install this feature and any selected subfeatures**. The **X** changes to a checkmark. Table 1 provides a brief description of the software components listed in the Intel(R) PROSet/Wireless Installer window.
11. Click **Install**. The installed components are listed in the Intel(R) PROSet/Wireless Installer after the software is installed on your computer.
12. Click **OK**.